AMERICAN GAS JOURNAL

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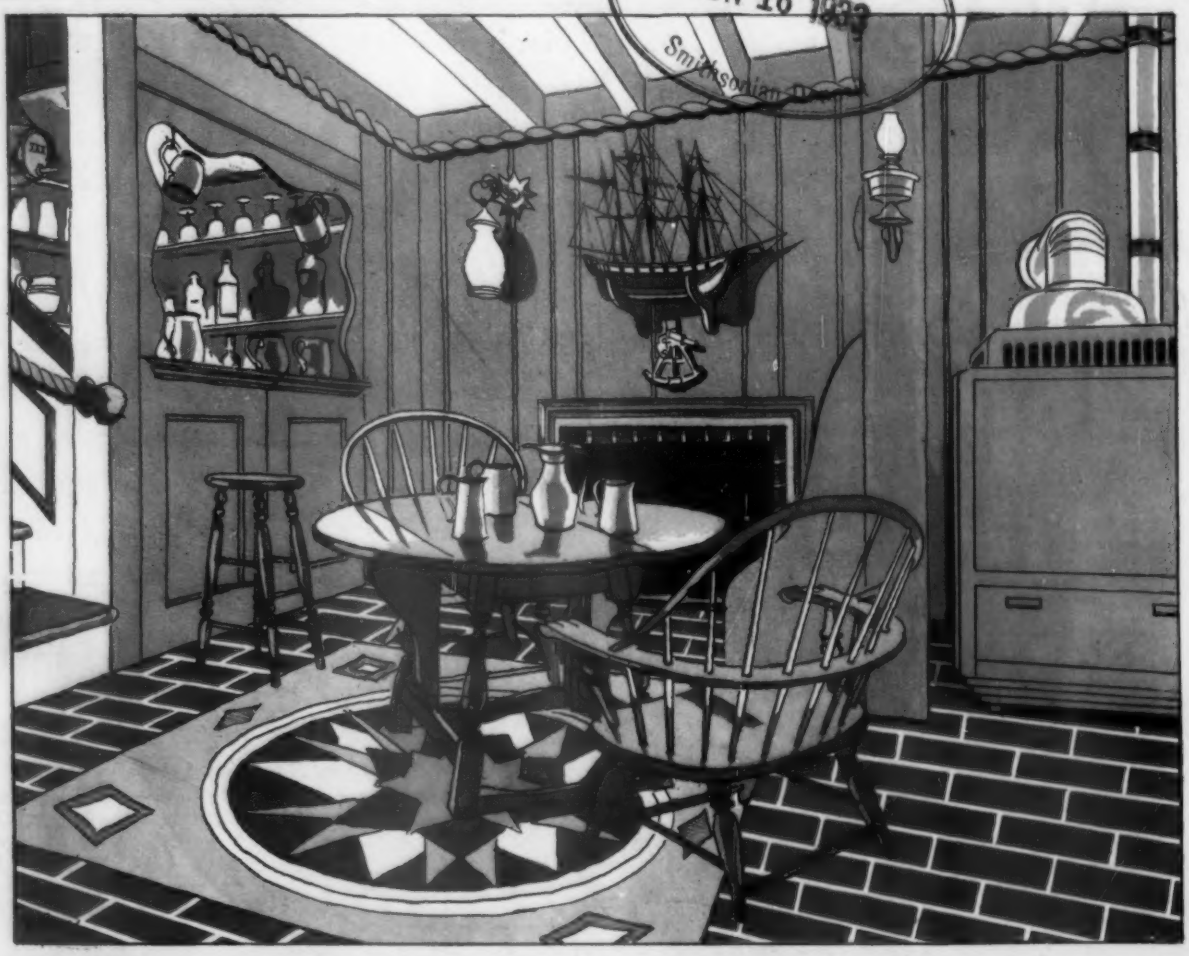


THE NATIONAL GAS BOILER

French grey enamel cover, with chromium fittings, attracts interest wherever displayed.

Engineered to meet the most rigid requirements of the Gas Heating Industry.

NATIONAL GAS HEATING

A Division of NATIONAL RADIATOR CORPORATION Johnstown, Pa.

Magic Chef

NATIONAL ADVERTISING *is* DOUBLE-EDGED . . . .

MAGIC CHEF national advertising is a keen-bladed sword which has been tempered and tested by 14 years of persistent effort in educating women to more advanced methods of cooking.

In its advertising over this period, American Stove Company has always kept foremost the twofold purpose of stimulating the sale of better gas ranges and promoting the larger use of gas as a cooking fuel.

This Spring the double-edged effectiveness of American Stove Company's national advertising is even greater than it ever was before. More than 33 million advertisments dramatically present the story of special Magic Chef features in such a way that American housewives will be responsive and ready for effective demonstration.

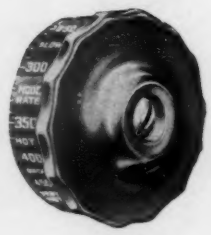
The other keen edge of this advertising, the promotion of gas as the ideal fuel for cooking, represents substantial co-operation in protection of the cooking load, as our contribution to an urgent need of the gas industry.

One of the series of full page Magic Chef advertisements appearing in leading national magazines this Spring

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

NEW YORK • PHILADELPHIA • ATLANTA • CLEVELAND
CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES



Look for the
RED WHEEL
When you buy a
MAGIC CHEF

Magic Chef

AMERICAN STOVE COMPANY

(Look for this Trade Mark)

AMERICAN GAS JOURNAL

Established 1859

JUNE 1933

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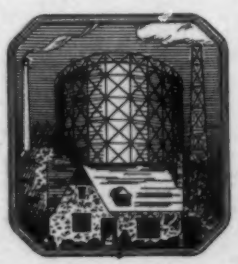


VOLUME 138
NUMBER 6

WHOLE
NUMBER 3714

Here it is!

AGP

IDEAL GAS CONVERTOR

A combination of features never before incorporated in a conversion burner unit.

THROTTLING CONTROL for boilers and WARM AIR FURNACES. Secondary air control. Thermostatic pilot.

ALL MECHANICALLY OPERATED and centered in one valve.

ROOM TEMPERATURE control. Three sizes for all types round boilers and furnaces up to 30 inch firepot.

NOISELESS IN OPERATION.

Compact — Sturdily constructed — Easily installed . . . . PRICED RIGHT!

WATCH FOR IT!

WAIT FOR IT!

AMERICAN GAS PRODUCTS CORPORATION

40 WEST 40th STREET, NEW YORK, N. Y.

Division of AMERICAN RADIATOR COMPANY

Editorials

INFLATION is coming. No one can doubt this assertion as borne out in the article in the current issue by Mr. McBride. The Administration regards as part of this inflation program the raising of prices of industrial materials and the stabilization or raising of wages. Cost of things purchased will, therefore, rise if the program is successful.

Anyone who is a pessimist and thinks that the Administration program is going to pieces had better not buy now. We hardly know what such a chap should do. In any event he had better dig a deep storm cellar with a tight door, and prepare to run for it if his expectations are met.

Everybody else, and that's most of us, will pay more for deferred purchases. It seems logical that one should, therefore, at once begin contracting for certain future needs. This means not only raw materials; it means also repair parts, new equipment, supplies,—even large items of new plant or distribution system.

A "Buy Now" program seems clearly indicated.

IN our judgment one of the most masterful boosts given to gas appliance selling was the bringing out and subsequent rapid marketing of the Air-Cooled Electrolux Refrigerator. Further, it is our opinion that the enthusiasm with which this gas burning prodigy has been received will be instrumental in accelerating the sale of other types of gas appliances—if our merchandising men will but catch a trifle of the elan of this appliance and its sponsors and indulge in the proper expenditure of "gray matter" and "elbow grease."

Especially during the past two or three years, gas companies have been accused of laying down on their selling job and in this regard it is a pleasure to quote from April-May issue of *The Electrolux Refrigerator News*:

"Although the gas industry has been criticized for lack of selling enthusiasm on its appliances, it would seem that the new Electrolux will go a long way toward disproving that theory. Never in the history of the industry has greater enthusiasm been shown for any product."

To those who can stand a warming of the heart cockles or who are wallowing about in the doldrums we vigorously recommend a copy of the aforementioned number of *The Electrolux Refrigerator News.* Then, if after they have studiously conned over its inspiring pages they cannot perk up, it is suggested that they go into some such lachrymose occupation as professional mourner to a hypochondriac undertaker.

THE success of the recent Production and Chemical Conference, particularly when viewed in the light of present business conditions, should serve to convince the most timid that this meeting should be held annually; we can scarcely get along properly without it. The inspiration and lessons furnished by this latest Conference will be found invaluable.

The somewhat heated but always friendly discussions which ensued over certain phases of some of the papers indicated that the technical fellows are literally on their toes. They are a harbinger of startling progress in the near future.

Also, the scope of the papers, especially those which lead to widespread discussion of the interchangeability of natural and manufactured gas, cannot but presage a continually closer alignment of the technical minds in both of these branches of the industry.

Any company that sent delegates to this Conference can be assured that these men brought back with them more than one idea that should shortly translate itself into better and more economical solution of their current problems.

Finally, the Association merits commendation for the efficient manner in which the sessions were carried out.

ONE of the most difficult objectives to attain in the matter of cooperation with dealers is that having to do with the neat and attractive appearance of the dealers' windows and display floors. This does not apply so much to the hardware, furniture and independent appliance stores as it does to the plumber—but the latter class of dealers far outnumbers the others.

The plumber might be ever so much of a good mechanic and even a business go-getter, but lack of necessity has caused him to bother his head but little relative to the attractiveness of his window and premises. By this it is not inferred that the selfsame windows and premises have not been kept neat and free from dust and grime; however, mere neatness does not draw prospective buyers into a place of business—there must be a subtle combination of art and psychology which when properly handled make up the modern impelling window display. The same principles applied to the inside of the particular place of business constitute the attractive and order-producing display floor.

Obviously, the average plumber—like the average workman or employee in any other line of activity—cannot be expected to metamorphose quickly into an artistic trimmer of windows or display floors; it just isn't "in the wood." The solution of this problem, at least in the beginning, calls for careful overseeing on the part of the gas company—and, unfortunately, this overseeing or consultation service involves much expenditure of time and money, which must be borne largely by the utility.

Henry McRiley

Editor.

FIRST MONTH IN BROOKLYN 1012 RETAIL SALES with NEW Air-Cooled ELECTROLUX

An additional 691 sales made wholesale to local builders and real estate operators

WITHIN a month after the introduction of the New Air-Cooled Electrolux, Brooklyn Union Gas Company set their all-time record for refrigerator sales. But it was not surprising. They had been hitting the high spots for weeks! During the first month, they netted a total of 1703 load-building sales with the New Air-Cooled Electrolux. Insured themselves 1703 more homes with all-gas kitchens. Over 59% of these sales were retail. The rest wholesale. And they're still going strong!

Demand has increased steadily

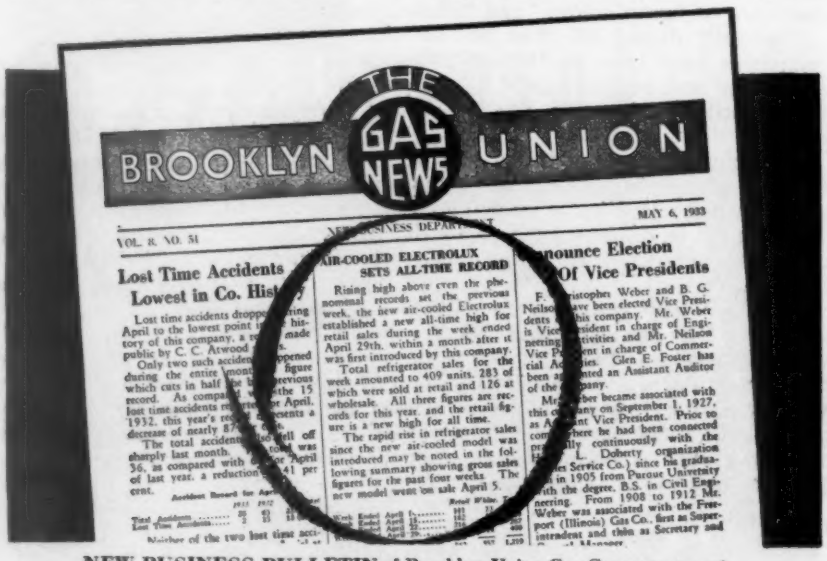
Let us quote the enthusiastic reports of B. U. G. Co.'s New Business bulletin. *The first week!* "So great has been the preference of Brooklyn and Queens residents for the New Electrolux that every retail refrigeration sales record in the company was smashed during the first week that the refrigerator was on sale." And the *second week:* "The New Air-Cooled Electrolux continued its record-smashing performance in sales during the week ending April 15th, despite the fact that the period included both Holy Week and the Passover Holidays." The third and fourth weeks saw even greater sales increases.

Electrolux gives impetus to other appliance sales

An important effect of the phenomenal public acceptance of the New Air-Cooled Electrolux was a sharp rise in *other* appliance sales. Reports Brooklyn's bulletin, "With Electrolux showing the way, sales records during the week ended April 8th fell like autumn leaves. During the week, orders were taken for 617 appliances . . . This total is far above that of any week this year."

There's still time to get your share

Brooklyn's record-smashing Electrolux sales are being duplicated in scores of other cities. It's an Electrolux year! And there's still time now to take advantage of the important trend to Electrolux-buying, if you act *at once*. For full information and sales and merchandising suggestions on the New Air-Cooled Electrolux, wire, phone or write Electrolux Refrigerator Sales, Inc., Evansville, Ind.


THE BROOKLYN GAS UNION NEWS

MAY 6, 1933

Lost Time Accidents Lowest in Co. Hist

AIR-COOLED ELECTROLUX SETS ALL-TIME RECORD

Rising high above even the phenomenal records set the previous week, the new air-cooled Electrolux established a new all-time high for retail sales during the week ended April 29th, within a month after it was first introduced by this company.

Total refrigerator sales for the week amounted to 409 units, 283 of which were sold at retail and 126 at wholesale. All three figures are records for this year and the retail figure is a new high for all time.

The rapid rise in refrigerator sales since the new air-cooled model was introduced may be noted in the following summary showing gross sales figures for the past four weeks. The new model went on sale April 5.

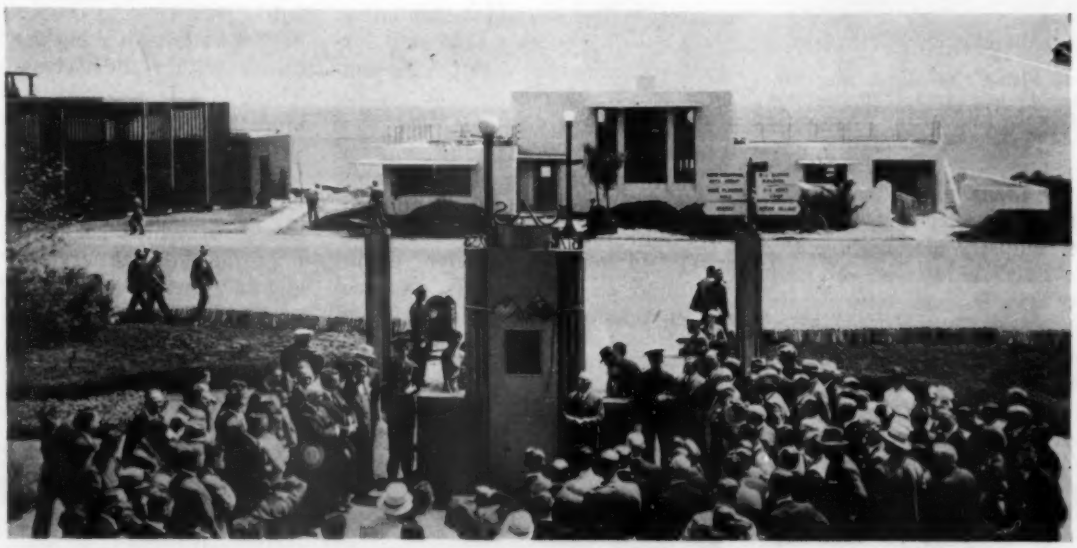
nounce Election Of Vice Presidents

NEW BUSINESS BULLETIN of Brooklyn Union Gas Company reporting fourth successive week of unprecedented Electrolux sales increases.

NEW *Air-Cooled* ELECTROLUX THE *Gas* REFRIGERATOR

AMERICAN GAS JOURNAL
June
1933

Hewitt Dedicates *Fountain of Flame* of Century of Progress Exposition



Arthur Hewitt, President of the American Gas Association, making dedication address before group of gas industry executives at the Fountain of Flame directly in front of Gas Industry Hall.

THE Fountain of Flame, situated in the forecourt entrance to Gas Industry Hall at the Century of Progress Exposition, was dedicated June 3 by Arthur Hewitt, president of the American Gas Association. Present at the ceremony were more than one hundred officials of the gas industry who were in Chicago attending the Executive Conference of the Association.

Symbolizing the service rendered by gas through the medium of heat, the Fountain of Flame is a tall pilaster-like structure about twelve feet high which glows with various luminous colors among which is one resembling red hot iron, suggestive of the use of gas fuel in the industrial and metallurgical industries.

Across the top of the structure is the word "GAS" silhouetted against a jet of luminous gas flame symbolizing the service being rendered by natural and manufactured gases in modern civilization. At the top of a fluted column to the left appears the year "1817" in block letters, designating the year in which the gas industry was born in this country. At the top of a similar column to the right is "1933" symbolic of the 116th year of the gas business in the United States.

Tablet on Fountain of Flame at entrance to Gas Industry Hall, dedicated June 3rd.

The fluted columns glow with various spectral colors, while in the concave central niche of the Fountain is shown a large luminous flame. At the base of this flame a jet of colored and luminescent water bubbles forth and cascades into lower pools.

In his brief address President Hewitt spoke as follows:

"In answer to Chicago's invitation to come and see what the mind of man has been up to during the most dramatic of all past centuries, 1833 to 1933, we are, happily, among the first representatives of basic American industries to visit A Century of Progress International Exposition.

"The theme of this vast undertak-

Fountain of Flame symbolizing the service rendered by gas through the medium of heat. Directly back of the Fountain is the main entrance to Gas Industry Hall.

ing and its 12,000 exhibits is mankind's mastery over nature, with science and industry dominating the picture. Few industries, I may truthfully say, fit into this picture with such exactness as the gas industry. We have taken coal, nature's black diamond, and have converted it into the highest form of refined fuel, in the meantime making available to science a vast treasure chest of by-products. We have taken natural gas, a fuel beyond the ingenuity of mankind to duplicate, and have subdued this giant to a point where it has become a tranquil and obedient servant of home and industry.

"At the beginning of this century, we were the bearers of light. One use only was made of gas—illumination. Shortly thereafter came the industrial upheaval which threatened for a time to write our epitaph but which, instead, ushered in our rebirth. We cast off our role as the bearers of light and entered the infinitely greater opportunities for service and growth awaiting us in the field of heating. Today we are dispensers of the cleanest and most versatile fuel available to mankind, an achievement so far-reaching in its consequences that it has altered the face of civilization.

"Visible evidences of the gas industry's contributions to a century of progress in science and industry are seen in every part of this great Exposition project. The formal exhibits located in Gas Industry Hall, Home Planning Hall, General Exhibits Building and elsewhere portray the old and new in the field of heat utilization and the strides made therein by gas fuel. Ultra-modern developments in home comfort and convenience, depicted in striking fashion in the model homes, rely upon gas fuel for their fulfillment. Here gas fuel takes a bold step forward and enters the realm of air-conditioning, making it possible for the home maker to become her own weather maker, winter and summer.

"In the fabrication of automobile tires, the manufacture of automobiles and the production of other articles in some of the "live" exhibits found on the grounds, gas fuel makes possible the animated and realistic effects. Even more satisfying, however, is the extent to which this Fair relies upon gas fuel for cooking, space heating and water heating. We dominate the restaurant and other kitchens here as we do elsewhere throughout the nation, and the many structures erected on these grounds are ninety-eight per cent gas heated. Under the terrain of this site are 26,000 feet of gas mains —unseen evidence, unfortunately, of the vital service we are called upon to render.

"Into the making of this Exposition have gone five years of courageous planning, unhalted by the collapse of trade and the disorganization of business. Chicago's slogan, "I Will" has become a victorious reality, again demonstrating to the world that when a people resolutely persist in doing a thing they have the power within themselves to do it. There is a lesson here for all mankind to learn."

Rufus C. Dawes, president of the Exposition, followed Mr. Hewitt with some brief remarks, in the course of which he emphasized the importance of gas service to the Fair and to America at large. After the ceremony a tour of inspection was made of the exhibits in Gas Industry Hall, Home planning Hall, the model homes and other buildings where displays of definite interest to gas men are featured.

Model gas home, completely gas-serviced, built to half-scale proportions—a striking feature of the gas industry exhibit.

GAS
THE ULTIMATE
IN FUEL

INFLATION and the Gas Man

By R. S. McBRIDE

Consulting Editor, American Gas Journal

WASHINGTON has embarked on many strange enterprises lately. Collectively they form a program of inflation. And he who would prosper in the future should study and understand what these developments mean to him individually and to his business activities.

The gas industry has been perhaps as little directly affected by these projects as any major industrial group. But this does not mean that the indirect consequences are either negligible or remote. They will be very real. Of course, no one can at the moment say precisely what they will be in a quantitative sense. It is not too early, however, to appraise their direction of influence and to some extent, their magnitude.

Controlled Inflation

The word "inflation" has had to money-minded Americans terrifying implications. Of late, therefore, those who recognize the necessity of the phenomenon and fear the word in its brutal form have adopted the phrase "controlled inflation" as a substitute. And, of course, the meaning of this phrase varies according to the user. It is rapidly becoming evident what is meant by it when used in federal Administration circles.

The term should be taken to mean a restoration of the exchange ratio between goods, services, and money, so that there may be more nearly a social equality between wage earners, raw-materials producers, marketers, and the lenders of money.

Substantially all the great pieces of inflationary legislation have been directed at the basic idea of raising goods prices. The outstanding example of this effort has been found in the Farm Relief Bill. The gas man may say this is a far cry from city public-utility affairs. But it is not. It has an immediate and extremely important consequence. Let us see if we cannot be convinced of that by a simple line of reasoning.

Raw-Materials Prices

If agricultural relief is accomplished it will mean that the farmer is going to get more for his wheat, corn, hogs, milk, and other agricultural products. This is essential if the farmer is to pay his taxes, interest on his mortgage, his fixed-sum debts. The objective, of course, is to push back these dollar obligations to a reasonable proportion of his gross income so that he may have something left with which to buy shoes and shirts, shingles and silos, threshers and mowing machines.

Such changes are essentially of a sweeping nature and cannot be brought about for more than a third of our population without effecting a similar change in other divisions of society. Materials costs will rise generally. This is one form of inflation. It is just as important to the grocer, the shoemaker, and the factory proprietor as it is to the farmer. To those who produce, rise in goods prices generally means an increased margin of earning power. Secondarily it means purchasing power. And it is this purchasing power which we are seeking to establish.

Directly to the gas industry it means that the goods which they buy are likely to cost more. In this we mean they will cost more in dollars per unit of commodity. We can put down, therefore, as a general conclusion that the first effect which the gas industry will experience as a result of inflation, controlled or otherwise, will be higher costs of raw materials and other goods purchased.

Wage Effects

When the proprietor of a factory or merchandising establishment or the producer of raw materials is experiencing the benefit of rising goods prices, the wage earner is encountering at least potential disadvantage. Every wage earner who is on a fixed income per year or who is fully employed at a fixed wage per shorter unit of time can buy less of the higher priced commodity. However, not all wage earners are of this class. In fact the majority of those usually included within this term are wage earners compensated on an hourly or daily wage schedule. This class may actually be benefitted. The rising goods prices stimulate buying power of the population. The enlarged buying power increases factory output, demands more transportation service, stimulates trade, increases the number of working hours, adds to this wage earner's total monthly income.

Obviously then, wage effects during controlled inflation may be either favorable or unfavorable to the individual according to whether he receives a salary type of compensation or an hourly-wage type, and according to whether as an hourly-wage

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Factors in Inflation

Definite Administration projects and objectives at present include:

1. **Reduction of the gold equivalent of the dollar.**
2. **Reduction of the dollar's value in terms of foreign currencies.**
3. **Limited additional monetization of silver.**
4. **Lowered tariffs by reciprocal agreements for increased international trade, especially in farm products.**
5. **Increased commodity prices.**
6. **Regulation of trade practices by voluntary industry agreements with Government compulsion on laggard minorities.**
7. **Increased wages, both in dollars and in annual buying power of the wage earner.**
8. **Public works, reforestation, Tennessee Valley development, as the basis of new employment for millions.**
9. **Renewed manufacturing and trade activity, based on enlarged buying power of wage earners.**
10. **Expanded credit and active use of full credit facilities.**

earner, his regularity of employment is increased or not. Within the gas utility field will be found many of both types of employees. To the salaried workers, inflation means distress unless wage rates rise. To those employed on hourly and daily rates, if increased business means increased employment they automatically get their offset for the inflation effects.

The employing gas company of course will gladly welcome the increased activity and gladly give increased employment to the part-time workers who have been on furlough. They must also consider the situation of the "white-collar" class receiving salary-type compensation. Hence to the gas company the wage effects may be either favorable or neutral in consequence on earnings. They cannot be detrimental unless wage rates paid rise faster than sales-rate schedules. This is highly unlikely; management was never built that way in *any* industry.

Let us summarize as the second major effect of inflation the wage phenomenon; and let us conclude that this means nothing detrimental, possibly something temporarily advantageous, to gas-company stockholders. But let's not forget that the major effect on employees may not properly be ignored.

Gas Rates

In times of deflation there are always many demands for reduced utility rates. This particular depression period has been rather a striking exception to this general rule. Perhaps the demands for rate change have lagged more than usual, though no one must forget that there have been many demands and some changes.

Early in May there was a decision rendered by the Supreme Court of the United States that may bring to a major crisis this question of public utility rates. This decision in the case of Los Angeles Gas & Electric Company said in effect that the public does not guarantee investments in utility enterprises. The historic cost based on prudent investment is a dominant factor. Some weight may be given to reproduction new costs as of a current date. But all factors collectively must be used in reaching a fair rate-making value and this value may be changed at any time with modified economic conditions so long as the changes be not unreasonable or capricious.

This in effect means, and the court was unquestionably intending this meaning to be evident, that in times like the present, the gas rates might be made lower in recognition of the fact that all types of investment and service are worth less. In a later article this extremely important case will receive its deserved, more important interpretation. It is cited here only to emphasize the fact that deflation, and on the contrary inflation, are a factor properly to be recognized in rate making. One may safely conclude, therefore, that if a program of controlled inflation successfully develops under federal influence, there will be a direct consequence on rate-making value and public utility appraisals. This effect of controlled inflation will, of course, be to raise the proper rate base. To the extent, therefore, that inflation succeeds, justification for present demands for lower gas rates may subside. Please note that we do not say that the demand will subside. Merely the legal justification for it is affected.

Effects of Inflation on Gas Industry

1. **Higher cost of raw materials.**
2. **Higher prices for supplies, repair parts, plant and utilization equipment, and construction.**
3. **Higher wage demands where present employment is less than 30 to 40 hours per week unless employment is restored to this level.**
4. **Continued demands for lower gas rates, but with less basis for effective court action as prices and wages rise.**
5. **Difficulty in refinancing with large competition by Government for investment funds. (Public debt will probably reach $30 billion by 1935.)**
6. **Higher prices in competing fuels, coal and oil, but renewed vigor of merchandising these fuels.**
7. **Increased purchasing power of household customers.**
8. **Large increase in commercial and industrial sales opportunity.**
9. **Full restoration of peak of gross income from gas sales.**
10. **Increased profit opportunity, where vigorous merchandising is done; elsewhere profit shrinking.**

Cost of Money

The second financial factor affecting net returns from utility investments is the cost of the money involved. During a period of low-money cost, utility companies often are able to gain significant advantage for their stockholders by discreet refinancing of mortgage bonds, debentures, and other funded debt. Today such refinancing is extremely difficult. If re-flation occurs in the securities market, that may be helpful to the management that wishes to accomplish new company financing. But a far more important factor is likely to be the Government's demand for credit.

One of the last major legislative efforts of the Administration has been the public works bill. The billions of Government credit which will be demanded to accomplish its objectives are rather appalling as peace-time measures. Many feel that bankers recognizing the necessity of these Government issues are bending every effort toward stabilizing them, even at the expense of industrial securities. Some such influence is surely to be felt for sometime to come. Prophecy is, however, extremely dangerous. Even slight turns in political or international developments often initiate large money-market changes. In fact, one who wishes to forecast regarding the fiscal difficulties of utility managements will do well to study, among other things, many of our questions of international relations that may ultimately prove the key log in the fiscal jam.

Generalizations and conclusions as to the cost of money had better be left to bankers. Bankers' advice on this matter can still be taken despite the public disrepute in which that profession seems lately to have fallen. And bankers' advice is going to be largely affected by the affairs of the individual company. Perhaps, therefore, generalizations are neither needed nor proper.

Competing Fuels

Gas has advanced its position relative to coal significantly during recent years. This is far more a re-

sult of conditions that are a discredit to coal managements rather than any great compliment to our own industry. Apparently we have profited more by their negligence than by our own aggressive merchandising skill. But we have profited.

Will inflation do anything to affect this inter-fuel competition, is a logical question. The answer is unquestionably "Yes" insofar as coal is concerned. Inflation should be helpful to gas because inflation will mean an increasing of the price of coal.

Oil is quite another subject. It has advanced in public favor even more rapidly during recent years than has gas. It has not yet reached the peak of its success in public acceptance. The industry has been aggressively merchandise-minded. It still is. It is even now threatening to take away from the gas man the household water-heating business, one of the most profitable base-load units of all our utility group. If oil can stabilize itself and thus permit managements to divert their efforts from production controversy to sales, then the gas man better watch his step.

In the case of both coal and oil, it is not unlikely that a part of the inflation program of the Federal Government will be a stabilization of production. Some months ago by its decision in the case of Appalachian Coals, Inc., the Supreme Court gave sound legal basis for more cooperative merchandising effort. By implication it also has given authority for production control in other lines of resource development, including petroleum.

President Roosevelt is adding his vigorous demand for such stabilization. Secretary of Interior Ickes has been designated as the leader of this movement for petroleum production control. On the basis of legislation suspending the full impact of old anti-trust laws, this cooperative effort of the industries is likely to be significantly successful. Industry agreements are becoming the fashion. And the first industry agreement in petroleum is certain to be a reduced production in the flush fields of the Southwest.

Some readers of the Journal may think that this means an increased price for petroleum. It does. But that does not necessarily mean increased advantage for gas. Stability in the oil business permitting new long-time merchandising contracts may, indeed, encourage our most aggressive fuel contemporary. This is not really inflation. But since the Administration has made stabilization of industry a part of its general program, it should not be ignored simply because it carries a slightly different economic label. Actually stable prices, though a trifle higher than formerly, may be more attractive to the prospective customer. Let's not fool ourselves, therefore, into assuming that inflation of coal and oil prices will be altogether a disadvantage to our competitors.

Gross Sales

In no other type of industry is the total demand for product more important than in the gas business. Infrequent turnover of capital makes a small percentage decline in gross sales vastly more important than to the manufacturer or merchant whose turnover is frequent. The greatest effect on our industry from inflation will, therefore, be measured by the effect on total sendout. This fortunately will be a beneficial effect.

In many respects the quantity of gas used in the home is practically independent of business conditions. One needs no less hot water for dish washing; nor do we take fewer baths. Some say that we actually cook more in the home in hard times than in boom. But by and large there is a very definite consequence even in household use of gas traceable to periods of restricted wage-earner income. The development of new uses for gas certainly is slowed down and some old uses fall off. Thus as buying power returns due to controlled inflation and resumed industrial activity, the gas man will benefit somewhat, though not largely, in household-gas sales.

The big effect will come in industrial and commercial sales. Renewed factory activity, more active merchandising, stimulated business generally, will enlarge the sendout significantly. Such effects may be expected definitely within six months, perhaps much sooner in certain particularly depressed communities. Even such remote things as battleship or road building are going to help the gas man's sales. A small but significant part of the three billions of public works money will find its way at one stage through the gas man's cash drawer.

Railroad men say that an increase of 20 to 30 per cent in transportation demand above the lows of this spring would mean real earning power for their railroads. The gas man can take comfort in the thought that even a 5 or 10 per cent increase in his business would be even more beneficial in its effect on net profits of the gas industry. It is certainly not too much to expect this enlarged industrial spending for city gas supplies. Perhaps all other factors affecting the prosperity of the gas utility business are less important than this. As a generalization, therefore, it is probably safe to conclude that stabilization of industry and controlled inflation are going to combine to give a better year in the next twelve months than we have had in the past twelve.

Notes on High Pressure Gas Distribution

DISTRIBUTION ENGINEER *States Factors Governing the Selection and Design of the Distribution System*

SELECTING the type of distribution system to be used in a new territory is comparatively simple, but a real problem is encountered when selecting and designing a replacement of an existing low pressure system. In new territories the decision is generally based on the investment necessary as indicated by estimates of the installation costs. The relative advantages of the various types in both service to the consumer and operating expenses have seldom been a factor in the decision, as approval for expenditures was necessary from those vitally interested in the initial financing and not in the operation of and service rendered by a utility.

There is a certain justification for such a policy of selection because of the continual existence of the cost of money resulting from capital expenditures which appears as a single item on cost records and is one of, if not the largest single item. However, the intangible but increasingly important item of continuous uniform service, available in any quantity at any necessary demand, is a factor in securing returns on investment and warrants intensive personal study by executives desiring to be in a favorable financial position over long periods. By service is meant not only the tangible visitations of representatives to consumers for the purpose of correcting difficulties when personality and training are combined to satisfy, but that continuous attitude of a consumer toward a utility that can only come from a type of pleasure resulting from the continuous ease and satisfaction from the use of a product.

Inertia to a policy change is also a common reason for the continuance of low pressure distribution. The error of basing the type of system on initial investment alone has been forcibly demonstrated in several localities where the advent of natural gas with an attendant lowering of rates resulted in an increase in both the consumption per meter and in the peak hourly demand, which could not be properly cared for due to the insufficient capacity of the low pressure system and the high consequent cost of installing additional feeder mains and district regulators. The lack of distribution facilities compelled the discontinuance of sales efforts and certain types of consumers had to be discouraged or refused.

Design Choice

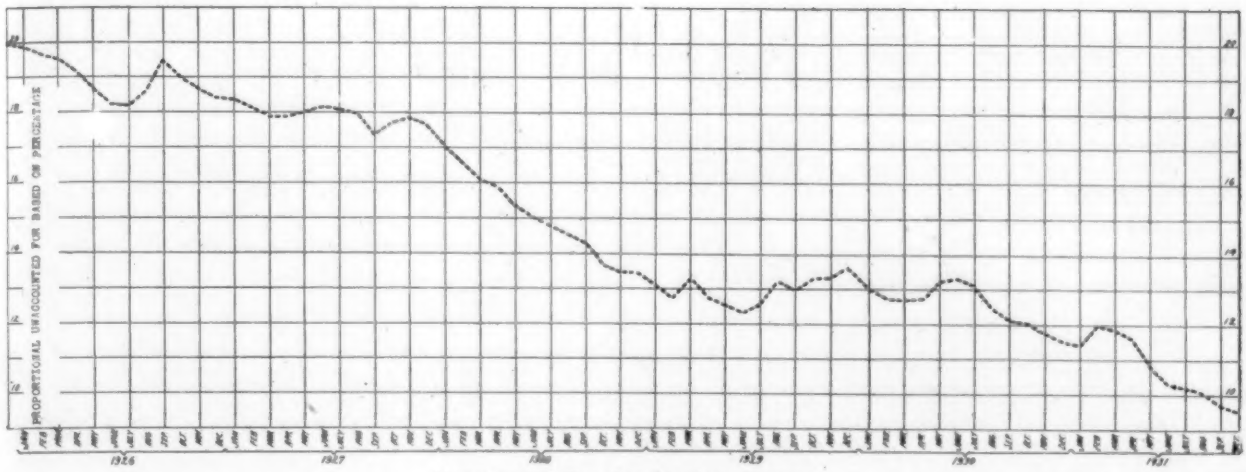
Often, when deciding in favor of a system other than low pressure, it has been deemed advisable to design for low pressure during the off peak hours and a so-called medium pressure during high demand periods by installing house regulators adaptable to these variable conditions. In this discussion such a design will be considered high pressure, since the cost would be only slightly different, if any, and the system could be inexpensively converted to higher pressures by changing the governor orifices and running governor vents if not initially installed.

The selection and design of a distribution system is not a problem that lends itself to an exact mathematical solution, as many of the unknowns must be selected from the experience and preferences of some one individual. There are certain theoretical designs which it may be desirable to approach, such as the ideal square mile design for low pressure distribution, but they are seldom attainable in practice and a system must be adapted to existing conditions.

Every contingency to be encountered during installation and operation can not be foreseen and provided for, but the aim should be to provide those practices which experience has demonstrated as being safe, efficient and economical. With the rapid development in all details connected with gas distribution, the most recent can not always be installed or set up as standard, hence instructions for execution of work and standards for material should provide for the progressive supplementing with new developments approved by theoretical concepts and practical judgment.

Safe practice is of paramount importance on any type of system, as there is not only a recognized hazard in the conveyance of gas, easily minimized by present engineering practice, but there is also the important fact that practically every utility must legally defend itself against accusations of negligence resulting in alleged damages to persons or property which have no basis in fact, but are difficult to prove if a plaintiff can intimate to the court that some phases of installation by a utility are not considered safe in average practices. There has been a rapid increase in storm sewer-explosions frequently attributed to gas, which have resulted in expensive legal defense by a utility, as the

Difficulties encountered during subway construction are increased by the large sized mains necessary in low pressure distribution.



Unaccounted For Gas Moving Average

Moving average of unaccounted for gas in which the curve at each month is proportional to the percent of unaccounted gas for the 12 preceding months. The system in 1926 was composed of 40 miles of low pressure mains mostly cast iron with bell and spigot joints and 300 miles of high pressure mains. These mileages gradually increased to 50 miles of low pressure and 650 miles of high pressure during the interval represented by the curve. The actual total quantity of unaccounted for gas has decreased each year. The results indicate what may be expected of properly designed and constructed high pressure systems. The lessening in total yearly quantities has resulted about equally from correction of leaks on bell and spigot joints and discarding obsolete house governors.

chemical features are highly technical. It is seldom possible to definitely prove that manufactured or natural gas was the cause of the explosion and often the utility can establish the probable cause as gasoline or oil vapors. Curves showing the consumption of gasoline and the number of these storm sewer explosions plotted against time indicate clearly that there may be a correlation between the increase of gasoline consumption and the explosions.

Safe Practices

In the field of manufactured gas there has been a hesitancy in the adoption of high pressure to distribution requirements because of groundless apprehensions on the part of men long experienced in low pressure that high unaccounted-for gas will result and individual leaks will be in such a quantity as to cause damage or explosions. There is one decided answer to this apprehension: the years of safe high pressure transmission and distribution in natural gas areas, not only in suburban districts but under city conditions of fully paved streets and abutting buildings where there is little natural chance for the leaking gas to escape directly to the atmosphere, have shown no more damage or claims than occur on the average low pressure system; and in many cases old high pressure systems have had no damage caused by leaks.

A large portion of the aversion to a high pressure distribution system has been due to the indiscriminate conversions to medium or high pressure of old low pressure systems with cast iron pipe having lead caulked bell and spigot joints. Modern studies have indicated that these joints are not even satisfactory for low pressure systems, let alone being used as a criterion of what may occur on a properly designed and installed high pressure lay-out.

Leak-proof systems are desirable not only from the damage standpoint but also for the minimizing of unaccounted-for gas. With modern joint practices and engineering knowledge, either cast iron, steel or alloy mains can be installed with no initial and a lower subsequent leakage than has been acceptable on low pressure systems for many years. The fear of leakage on high pressure lines has had the desirable effect of increasing the care with which joints are made up.

Another indication of the safety with which high pressure may be conveyed in city conditions has been the necessary installation of high pressure belt or feeder lines to reinforce the low pressure system at critical points. If confidence can be placed in these larger mains, which are in the nature of transmission lines, there is no question but that the smaller lines can be installed and operated without apprehension.

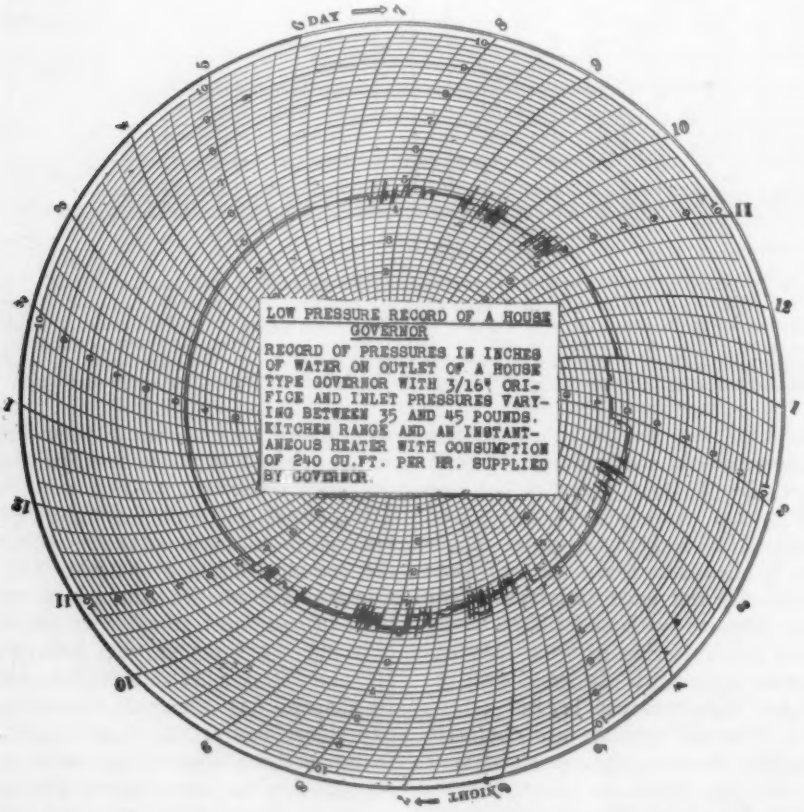
The use of extra heavy steel mains within city streets has been advocated as an added precaution in the conveyance of high pressure gas. This added expense is unwarranted, as the highest pressure reached under such conditions seldom exceeds fifty pounds. Standard weight pipe having an ultimate strength within the common limits of fifty to sixty thousand pounds per square inch has been in use for a number of years, carrying pressures varying between 300 and 350 pounds without failures. In determining the wall thickness, experience has proved that a safety factor of three is more than ample to provide for the maximum unknown stresses. Standard weight pipe will provide the necessary strength, but the more vital points occurring at joints, fittings and valves should be designed and installed to provide a strength equivalent to that of the pipe.

Valve Strength

Particular attention is called to the strength of valves both in the flange connections and in the body of the valve. Keen competition among manufacturers is often detrimental to the strength of gate valves due to the decrease in wall thickness. Valve breakage has resulted in serious damage generally caused by a fracture in the gate valve at the point where the body joins the short section between flange and body. Unless the body adjacent to and connecting link between flange and body have been provided with extra metal thickness reinforcing ribs should be insisted upon.

Safety practice extends into the

policies of operation. To assure that all practices pertaining to safety will be followed, it is advisable that after the initial installation of a system, which if constructed by a contractor should be strictly supervised and tested by the utility, all further work be done by a direct representative of the utility instead of permitting plumbers to add to, change or repair any part of the system owned by the utility, even in small territories. This is not a reflection on the ability of competent plumbers to produce a quality of work fully equivalent to that of any utility trained representative, but an employee naturally has a greater sense of responsibility directly to the utility than a person on piece work, as occurs when contracting out each particular job.


DAY
NIGHT
LOW PRESSURE RECORD OF A HOUSE GOVERNOR
RECORD OF PRESSURES IN INCHES OF WATER ON OUTLET OF A HOUSE TYPE GOVERNOR WITH 3/16" ORIFICE AND INLET PRESSURES VARYING BETWEEN 35 AND 45 POUNDS. KITCHEN RANGE AND AN INSTANTANEOUS HEATER WITH CONSUMPTION OF 240 CU.FT. PER HR. SUPPLIED BY GOVERNOR.

Efficient Practices

Placing efficiency before economy does not indicate its relative importance, as the two are closely allied. The application of the principles of mechanical efficiency will provide a system capable of distributing gas with a minimum drop in pressure when transporting the quantities assumed for design purposes and also sufficient strength in all parts to eliminate breakage under known conditions. Designing a system which will provide continuous uniform service to a consumer over a period of years requires judgment and experience far in excess of that necessary in selecting factors to be used in providing mechanical efficiency under existing or assumed conditions. High pressure provides a larger safety factor than low pressure systems to apply against future conditions, even when the future is predicted by the best of judgment and experience.

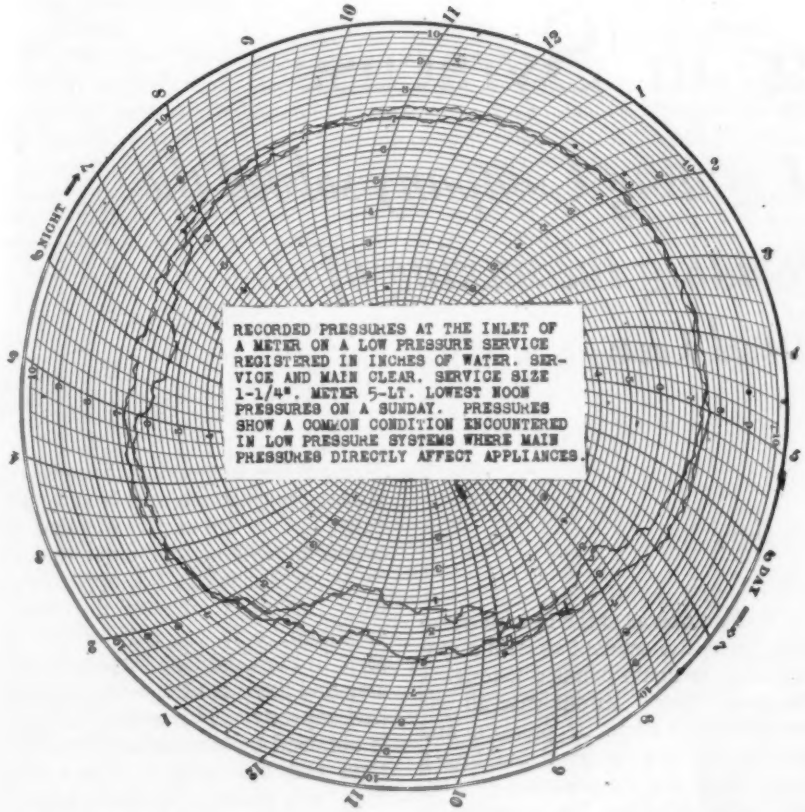
The adaptability of a new or remodeled system for the conveyance of other than the present type of gas distributed should be considered, although such changes may appear remote when plans are formulated. A considerable difference in gravity of gases has a marked effect on the carrying capacity of the mains.

A few years ago manufactured gas distributors became actively engaged in securing a share of the house heating business with the result that the departments responsible for the maintenance of service became suddenly and belatedly interested in methods of providing adequate distributing facilities for large load increases and demands on low pressure systems. A similarly large increase on a high pressure system requires only an increase in pressures which is unnoticed by a consumer, whereas on the low pressure system, variations in main pressure directly affects appliance performance. Installing additional high pressure compressors, if necessary, is usually more economical than increasing main sizes or running additional belt lines as feeders to a low pressure system. The gas industry must increase its sales from every available source and in any quantity, even though the demand may be high within certain small periods of time, if it is to maintain itself in the ever increasing competitive market. The reasons for an increased use of gas may just as easily result from the higher development of salesmanship as from the advent of natural gas. It is, therefore, necessary to provide systems which will not only economically distribute large yearly increases but also be sufficiently flexible to maintain service during sudden demands of short duration. A low pressure design must provide initial main installations based on the ultimate demand thereby often necessitating large fixed charges over a long period of years.

Advantages of High Pressure

A high pressure system with its inherent flexibility offers greater facilities for accommodating sudden increases in demand and provides an indication of sudden increases prior to consumers noticing any effect. A wider range of main pressures is available, the percentage variation being considerably above that possible on low pressure systems, as house regulators furnish excellent service over a broad range of inlet pressures. This has been amply demonstrated in cities where the advent of natural gas with its decreased cost resulted in large increases of house heating installations which were easily accommodated in the high pressure areas by increasing pressures. In almost identical cities the sale of house heating units was curtailed because the low pressure system could not supply the demand and under the rate allowed it would have been uneconomical either to replace with larger sized mains or install compressors, high pressure feeder lines and district governors.

In the industrial field combustion

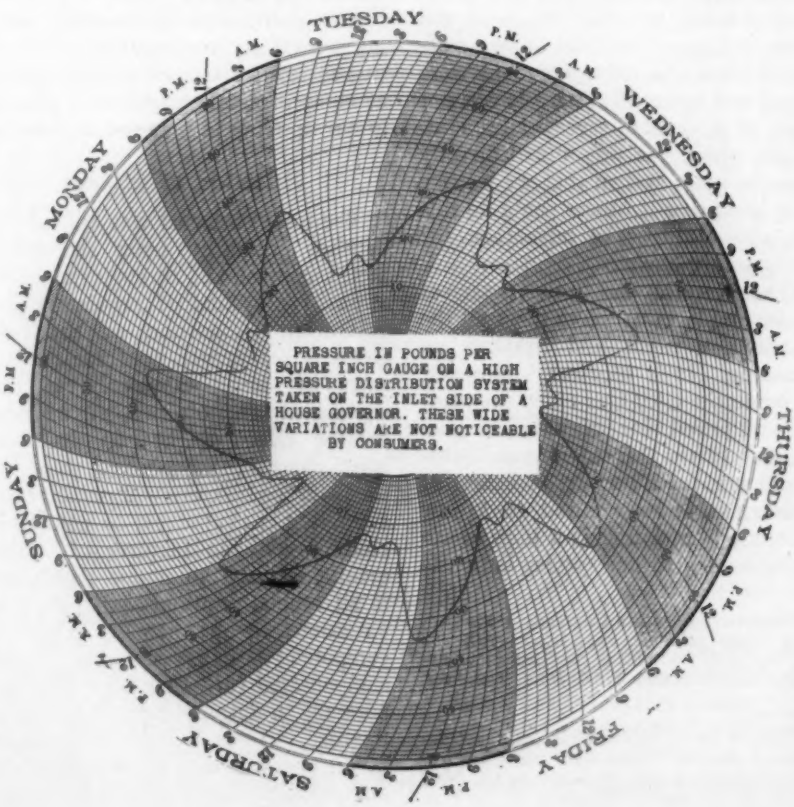

RECORDED PRESSURES AT THE INLET OF A METER ON A LOW PRESSURE SERVICE REGISTERED IN INCHES OF WATER. SERVICE AND MAIN CLEAR. SERVICE SIZE 1-1/4". METER 5-LT. LOWEST NOON PRESSURES ON A SUNDAY. PRESSURES SHOW A COMMON CONDITION ENCOUNTERED IN LOW PRESSURE SYSTEMS WHERE MAIN PRESSURES DIRECTLY AFFECT APPLIANCES.

efficiency often demands that gas or air be compressed by the consumer. However, by means of a high pressure meter it is possible to furnish the consumer with the necessary gas pressure, thereby eliminating the cost of compressing by the consumer. The cost of running distribution lines around such consumer's premises is decreased, since smaller diameter pipe can be used. In other industries the possibility of using high pressure gas to inspirate low pressure air should be investigated as the increase in burner efficiency may be the means of acquiring additional consumers. An example is the ceramic industry, where the use of high pressure gas forced the obsolescence of low pressure burners.

In suburban areas it is often necessary to serve extensive estates each having a number of buildings the total of which are considered as a single consumer, as the bill is rendered to one person. Low pressure distribution around the estate would require a large meter, necessitating space often unavailable in which case the consumer would have to construct a small house or pit for the meter. A high pressure meter occupies a comparatively small space and all makes incorporate dials giving corrected readings if desired. A factor affecting the decision of estates to install gas is frequently the initial cost of laying distributing lines to the various buildings. The use of a high pressure meter and distribution lines to each individual building lowers installation cost, even though the cost of governors in each building served is considered. Often the consumer desires to know the gas consumption in each building served, requiring the purchase of meters by the consumer and increasing the initial cost—unless the policy of the utility is to provide such meters free or on a rental basis. It is preferable for the utility to furnish the meters and retain ownership, as privately owned meters confuse records. Privately owned meters may be accidently relocated so as to register gas direct from a service instead of sub-metering, in which event the utility would have no record. All utiilties should avoid the confusion existing between many consumers and water companies relative to ownership of meters caused by vesting ownership in the consumer through charging for the meter but attempting to maintain supervision of its maintenance and repair.

The variation of pressure at appliance burners is minimized by house regulators on high pressure systems, thus reducing complaints originating from this source. The

(Continued on page 27)


TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
PRESSURE IN POUNDS PER SQUARE INCH GAUGE ON A HIGH PRESSURE DISTRIBUTION SYSTEM TAKEN ON THE INLET SIDE OF A HOUSE GOVERNOR. THESE WIDE VARIATIONS ARE NOT NOTICEABLE BY CONSUMERS.

Gas Mixing in Syracuse

How the Syracuse Lighting Company solved the various problems attending the mixing of Coal Gas and Natural Gas

By H. K. SEELEY

Engineer, Gas Dept., Syracuse Lighting Company

WE were at first somewhat concerned over the question of whether or not two gases differing as widely in characteristics as the Coal Gas and the Natural Gas would mix satisfactorily if simply introduced into a common main. In our previous experience, gases to be mixed were brought together ahead of a holder of relatively large capacity and the absence of difficulties we attributed to the opportunity thus afforded for diffusion.* Because of this idea, we first decided to mix our Coal and Natural Gas at the inlet of our storage holders and our early plans were developed along this line. It was not until after visits to several other situations where gas was mixed directly into the main system that we became convinced that if others could do this we also could. The advantages of doing so are obvious.

The Natural Gas usually arrives under ample pressure to meet all the distribution needs and requires no pumping. It is necessary, however, to pump the Coal Gas up to the pressure required for distribution purposes. If the Mixed Gas is introduced into a holder, the pressure, of course, must be reduced to a few inches of water and if a high or intermediate pressure system is in use for distribution as is the case in Syracuse, the entire sendout to such a system must be again handled through a Pumping Plant. In our case all gas would have had to be pumped and this would have involved building a boiler plant and the purchase of several large capacity compressors as well as an addition to the Pumping Plant building. The advantage of direct mixing was so evident that we decided upon this method without further ado.

This decision made automatic mixing a necessity and our next problem was to select from the several makes of equipment offered, the one which, in our opinion, best suited our needs.

Selection of Mixer

The mixer selected was one which depends primarily upon the volumetric control, i.e., through the operation of a system of regulators the volumetric proportion of the two gases is maintained constant for all rates of flow. Obviously, if the equipment functions properly and the heating values of the two gases remain constant, the heating value of the resulting mixture will remain constant. It is maintained by some, including the manufacturer of equipment, that such automatic regulation is all that is required and that such variations in the heating value of component gases as may occur, can be compensated for, manually. Our experience to date indicates that this is the case, but that constant supervision of an operator will be required. In our situation, the heating value of the Natural Gas at present changes very slightly, not enough to cause any difficulty, but we are not certain that this condition will always exist and the same statement can not apply to the Coal Gas used. Under the present conditions only one-half of the retorts in the Coal Gas Plant are operated and these at little more than one-half capacity. This reduced capacity is obtained by lengthening the coking time and operating in this manner there is a constant fluctuation in the heating value of gas coming away from the plant which is only partially ironed out by the holder. Realizing that this would be the case, we decided to install a calorimetric control on the mixing equipment and the fact that this control operates frequently indicates to us that our decision was a wise one.

The Natural Gas as received at the Mixing Plant contains normally about 1020 B.t.u. per cubic foot and the Coal Gas entering the holder varies from 500 B.t.u. to 565 or 570 B.t.u. throughout the retort cycle. This variation is ironed out to some extent, but apparently, by-passing occurs under certain load conditions and this explains why the calorimeter functions as frequently as it does. The required heating value of the Mixed Gas is 875 B.t.u. per cubic foot. The mixing plant consists of the following parts as indicated on sketch 1; one constant pressure regulator "A" in the Natural Gas line which also acts as a check valve to prevent back flow and a shut-off in case the flow of Coal Gas to the plant is interrupted, two differential pressure regulators "B" and "C" each controlling the pressure drop across a butterfly valve, three butterfly valves "a," "b" and "c," a Thomas Calorimeter "CH" and recorder "R" and

** Syracuse Lighting Company previously had some valuable experience with the mixing of 575-600 B.t.u. coal gas with producer gas to attain a 537 B.t.u. standard.*

Read before the Joint Committee Conference of the Production and Chemical Committees, American Gas Assn., New York, N. Y., May 22-23, 1933.

the necessary piping and electrical connections.

The Natural Gas enters the plant through an 18″ steel main under a pressure which at present varies from 35 to 45 pounds. After passing through some gas cleaners to remove any construction or other dirt, it enters the Mixing Plant. The first piece of equipment in this building is a regulator "A" (sketch 1) which reduces the pressure and maintains its constant, (approximately 24 lbs. at the present time). The gas then passes through one or more of the several orifice meters "O" discharging into a header. Near the outlet of this header is a butterfly valve "a" which is operated by a regulator designed to control the pressure differential across a second butterfly valve "b" about forty feet further along in the 16″ main. The setting of this regulator is automatically varied by the controlling calorimeter. At the point where butterfly valve "b" is installed, the Natural Gas main in which it is located is running parallel to and immediately above the main carrying the Coal Gas and directly beneath this butterfly valve is a similar valve "c" in the Coal Gas main. The only difference between these two valves is their size, the one in the Natural Gas main being 12″ and the one in the Coal Gas main being 8″. These two valves are rigidly connected so that they open and close together and the areas of opening are constantly proportional. The pressure in the Coal Gas main at this point determines the pressure at the outlet of the mixer. Butterfly valve "c" is operated by a regulator designed to maintain a constant pressure differential across this valve, in our case, about 8″ of water. Any increase or decrease of this differential causes the regulator to open or close the valve as required to maintain the differential for which it is set. Every movement of this valve "c" produces a corresponding movement of the 12″ valve "b" in the Natural Gas main above.

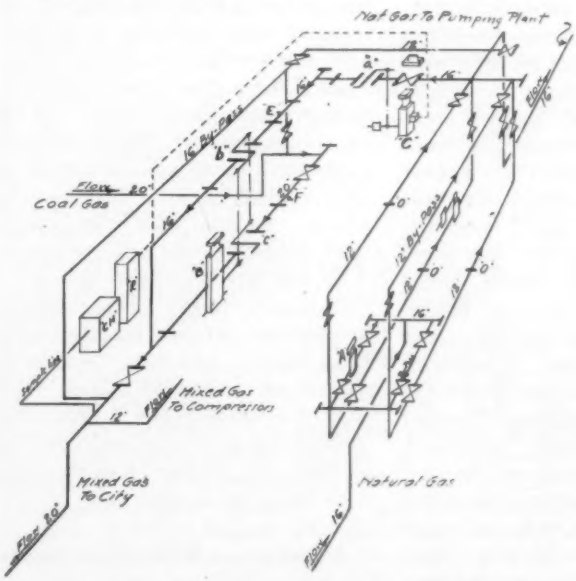


Fig. 1 Diagram of Piping and Equipment in Mixing Plant at Syracuse

We will assume that a supper load is coming on. The pressure indicated by the telemetric gauges located at the strategic points in the distribution system and registering in the Coal Gas Compressor House begins to drop. The operator in the compressor house noticing this drop speeds up the turbine driven compressor, thus increasing the pressure of the Coal Gas entering the Mixing Plant. The rate of flow through the Coal Gas butterfly "c" immediately increases, which produces a larger drop across the valve. The regulator at once detecting this increase, operates to open the valve sufficiently to recreate the proper differential. Due to the interconnecting mechanism the butterfly valve "b" in the 16″ Natural Gas main is opened a corresponding amount. The opening of "b" reduces the differential across it.

However, the regulator "C" is designed and installed to control this differential. As soon as this drops it immediately opens butterfly valve "a" in the line ahead of "b" permitting a greater flow of Natural Gas through "b" thus bringing the pressure drop back to its proper figure.

Now what has happened? The flow of Coal Gas through "c" has increased but due to the operation of the valve the pressure differential across it remains the same as before. Valve "b" has been opened so that its area of opening bears the same relation to that of "c" as before the change occurred. Furthermore, the differential across "c" is the same as it was before. Under these condition, the rates of flow of the two component gases are still in exactly the same proportion to each other and if the heating value of one or both has not changed, that of the mixture remains at the figure for which the plant is set to maintain. All of this takes place so rapidly that the Thomas Calorimeter will detect no change in heating value whatever.

We will now assume that the increased rate at which the Coal Gas is leaving the storage holder has produced a partial by-passing of the gas through the holder and that the gas coming from the Coal Gas Plant at this particular moment is materially lower than the 550 B.t.u. content on which the initial setting of the mixing plant was made. The result of this condition will be a reduction in the heating value of the mixture. The calorimeter which takes its sample immediately beyond the tee at which the two gases came together will shortly detect this drop in heating value. It immediately operates through a relay to change the differential for which regulator "C" is set. In this case the drop in the heating value of the Mixed Gas calls for an increase in the proportion of Natural Gas in the mixture. This is accomplished by increasing the flow of Natural Gas through the butterfly "b," by increasing the upstream pressure without changing the position of the valve. In actual operation, this is accomplished in the following manner:

Effect of B.t.u. Drop

The drop of two or three B.t.u.'s in the Mixed Gas throws the recorder of the calorimeter out of balance which closes an electric circuit to a relay which in turn momentarily sends current through a small reversing motor. This motor turns a screw thus increasing the tension on a spring controlling the setting or regulator "C." When this setting is increased, it means that the differential across butterfly "b" is not as great as that for which its regulator is set.

This regulator ("C") immediately sets about correcting this condition by opening butterfly valve "a" thus raising the upstream pressure on butterfly valve "b" and hence, the flow of Natural Gas through it. No corresponding change in the rate of flow of the Coal Gas line has taken place since there has been no change in the conditions governing it. Therefore, the proportion of Natural Gas in the mixture has been increased.

Compensating Increased B.t.u.

An increase in the B.t.u. content of the Mixed Gas from any cause, is adjusted for by reversing the operation just described. The corrections are made in steps of two or three B.t.u.'s which continue until the proper heating value is shown by the calorimeter. In normal operation, a departure of 5 B.t.u.'s from the setting is about the maximum reached.

The above describes the way the apparatus is supposed to operate and strange as it may seem, this is exactly the way it does work. Practically no difficulty has been encountered with this equipment since it was first put into operation. A loose setscrew allowed the connections between the two controlling butterflies to get out of adjustment so that without the calorimeter control the heating value of the Mixed Gas would have been materially different than the 875 B.t.u. for which it is set. The calorimeter control functioned so perfectly that the only way this maladjustment was detected was by the unusual frequency of operation of this control. One or two minor changes were made to the regulators as a result of experience in other situations after they were installed. With these exceptions the equipment functioned perfectly. The heating value of the Mixed Gas as shown by the recording calorimeter and checked by a second calorimeter located over a mile away and by the usual Junkers type calorimeter, seldom varies over 10 B.t.u. during the course of a day.

The Natural Gas arrived in Syracuse and all of the arrangements had been made for the appliance conversion before the mixing plant, just described, was complete. For the first two or three weeks, Mixed Gas was obtained by manually controlling the admission of the two gases to a storage holder. Then for a short period the mixing plant was operated ahead of the holder. At last came the day when the apparatus was to be placed directly on the City and from the beginning, this operation had been looked forward to with a certain amount of dread. Our customers' appliances had been by this time, all adjusted to burn 875 B.t.u. gas and we knew by experience that they would not burn 537 B.t.u. gas nor operate satisfactorily on straight Natural Gas. We had determined that the mixer would operate all right with constant outlet conditions as regards pressure and volume, but we were about to put it to test under different conditions and we faced this operation with some timidity. We took every precaution we could think of. The Mixing Plant was put into operation mixing into the storage holder and the City supplied from this holder through a centrifugal pumping unit located in another plant. A valve on the inlet of the holder into which the mixer was discharging, was throttled to produce a pressure somewhat greater than the pressure at the outlet of the pumping equipment in the other plant. Then a valve connecting the outlet of the Mixing Plant with the City distribution system was slowly opened. This operation was performed so slowly and carefully that we could not tell when the valve had been opened sufficiently to permit a flow through it. All this time we were watching the Mixing Plant very closely for evidence of some change of conditions. Nothing happened and it was not until the operator at the other plant telephoned to tell us that the check valve at the outlet of his centrifugal booster had closed, was it realized that the mixer was on the town. In other words, the thing which we had looked forward to with so much dread was accomplished with absolutely no disturbance whatever. To prove that this was not just a coincidence, we repeated the operation on several occasions with the same results. Apparently, this phase of a changeover to Mixed Gas is not as serious a problem as we had supposed.

Housing of Equipment

The entire equipment described is housed in a building approximately 42′ x 22′ and 12′ high, all inside dimensions with an annex 7′ x 18′. Considerable other equipment is also housed in these rooms. It is difficult to say exactly how much space is required solely for the mixing equipment, but this seems unimportant as it is probable that local conditions will usually govern the arrangement as well as the space requirements. However, we would have required not more than one-half the floor space given above if only the mixing equipment was to be housed.

One feature we recommend is the installation of the calorimeter in a separate room isolated by at least a fire proof wall from the Mixing Plant. There should be no communicating opening in this wall. All electrical equipment should be inclosed in explosion proof cases or better still, kept outside of the Mixing Plant proper. Such a plant is no place for open flames or sparking apparatus.

In our case, the pressure of the Coal Gas is raised to that required, by the use of centrifugal boosters, steam driven, and these seem to lend themselves particularly well to this type of a mixing plant. Other types of pumping equipment may serve just as well, but we have had no experience with such types.

Experience With Changeover

As this is written, we have been operating for over six months and have learned a lot about Mixed Gas. We have changed over the appliances of our 63,000 customers and needless to say, this has not been accomplished without some trouble. In the early stages of the change-over there was considerable variation in the heating value of the gas sent out and occasionally, customer complaints were attributed to this fact. However, for the last four months the regulation of this characteristic of the gas has been, as a general thing, extremely close. The fact that similar complaints have been received under these conditions now leads us to believe that they were caused by conditions other than the gas itself. This is further borne out by the fact that there has been no case where a sudden flood of complaints from all over the city, has occurred. The number received per day increased with the number of customers changed over, reaching a peak about two weeks before the work was completed from which point it gradually decreased until at the present time this number is not greatly in excess of what it was before the introduction of the new

(Continued on page 24)

ELEMENTS OF GAS TECHNOLOGY

Combustion of gases

IN American practice, natural gas calculations are always made on the assumption that the gas is dry, but for all other gases, it is usually assumed that they are saturated with water vapor.

The oxygen necessary for combustion is ordinarily furnished by the atmosphere, except for specialized purposes such as oxy-gas torches, etc., and for laboratory experiments. Pure dry atmospheric air has the following composition.

	Percent by volume
Nitrogen	78.03
Oxygen	20.99
Argon, Helium, Neon, etc.	0.94
Carbon Dioxide	0.03
Hydrogen	0.01

For most combustion calculations, the average composition of dry air may be considered to consist solely of nitrogen and oxygen in the following proportions:

	Percent by Volume	Percent by Weight
Nitrogen	79.01	76.89
Oxygen	20.99	23.11

These percentages are sufficiently accurate, since the inert gases argon, helium, neon, etc., act similarly to nitrogen, and the hydrogen and CO_2 are too small to affect the ultimate result in any except the most delicate laboratory work. However, ordinary atmospheric air invariably contains a certain amount of water vapor and this amount varies from day to day. As shown in table 6, there is a definite amount of water vapor which can be held by a gas at any given temperature. The amount of water vapor actually present in a unit volume of air at any temperature, expressed as a percentage of the volume of water vapor which would be present if the air were completely saturated, at the same temperature, is called the relative humidity. The *relative* humidity differs from the *percentage* humidity in that the latter is the ratio between the number of *pounds* of water vapor carried by one *pound* of dry air at any given temperature, to the number of pounds of water vapor which one pound of dry air would carry if it were saturated at that temperature.

In ordinary gas combustion calculations, it is customary to assume that the air is at 40 per cent relative humidity at 60° F. Under these conditions, each cubic foot of air will bring .007 cubic feet of water vapor into the mixture. As before stated, the gas itself is assumed to be saturated, except in the case of natural gas, and the moisture thus brought in with the gas must be allowed for in the calculations.

There are a great many complicated reactions incident to the chemistry of combustion, which deal with dissociation of gases and the question of chemical equilibrium, which will be explained briefly.

It should be clearly understood that all gas combustion reactions are reversible and that the higher the temperature, the more reversible such reactions are. It is also apparent that when actual combustion is taking place, there is a state of equilibrium between the combustible and the products of combustion, depending on the temperature and partial pressure of the various constituents, and some definite state of mixture. The equilibrium point of any reaction can be altered by changes in either temperature or pressure, and the amount of various materials which are in equilibrium at any one temperature is a constant. This is called the Reaction constant, and the law expressing the foregoing principle is known as the Law of Mass Action. This law states that chemical action is proportional to the *active* amounts of each substance present in a unit volume, at the particular point of the process being investigated. Taking the chemical equation expressing any reversible reaction, the reaction constant K is expressed mathematically as the product of the concentrations on the right hand side, each raised to a power equal to the number of mols reacting, divided by the product of the concentrations on the left hand side, each raised to a corresponding power. Thus, for the equation

$$H_2O + CO = CO_2 + H_2$$

the relationship is expressed by

$$K = \frac{[CO_2]\,[H_2]}{[H_2O]\,[CO]}$$

The numerical values for CO_2, H_2, etc., may be expressed in terms of partial pressures for each gas, as atmospheres or millimeters of mercury, or as concentrations (mols of each gas per unit volume of total gas) or as per cent by volume of each gas. The last is usually the most convenient. The numerical value of K for any given reaction depends only on the temperature and the units used, and is independent of all other conditions. This means simply that at any given temperature, after the chemical reaction has taken place and equilibrium between all the reacting substances and the products is reached, the final composition resulting from any initial mixture of the constituents is fixed.

When hydrocarbon gases burn, the final end products are always carbon dioxide and water, if the combustion is complete. It has been determined, however, that one or more intermediate stages are passed through before the end products are reached. These intermediate stages are caused by the fact that the hydrocarbons react first with oxygen to form alcohols or aldehydes, or both, depending on the hydrocarbon in question. The addition of one molecule of oxygen to most hydrocarbons gives an alcohol, and further addition of a molecule of oxygen produces an aldehyde. This is true at all temperatures. The aldehyde formed either breaks down imemdiately into CO and H_2, or may burn completely to CO_2 and H_2O. The aldehydes have very strong, pungent, characteristic odors, and when such odors appear in the products of combustion, it is immediate evidence that combustion is incomplete, due to insufficient oxygen.

In burning a gas in air, it is essential first to have a mixture which will ignite, and second, to raise this mixture to the temperature at which ignition will take place. It is also necessary to know the speed at which such a mixture will burn, as certain mixtures are explosive in their nature. Gradual heating of an air-gas mixture causes a slow but regular increase in the speed of combustion. When the ignition temperature is reached, chemical combination is no longer dependent on external heat, and combustion takes place practically instantaneously. The ignition temperature is the lowest possible temperature at which this rapid combustion can take place, and is that temperature at which heat is generated by the combustion, more rapidly than heat is lost or radiated to the surrounding atmosphere. When this state is reached, the combustion thus becomes self-sustaining. Table 7 gives the igni-

tion temperatures at atmospheric pressure, of some of the common gases.

TABLE 7

Ignition Temperature of Various Gases, at Atmospheric Pressure

Gas	*Ignition Temperature in Air, Degrees F.*
Hydrogen	1076 — 1094
Carbon Monoxide	1191 — 1216
Methane	1202 — 1382
Ethane	968 — 1166
Ethylene	1008 — 1018
Acetylene	763 — 824

The ignition point of most combustibles is lowered by increasing the pressure, and this point has great influence on the design of gas engines. Here the explosive mixture is compressed to several atmospheres and this compression raises the temperature a considerable amount. It is therefore necessary to do one of two things—either choose a fuel which will withstand the compression without pre-ignition or increase the clearance in the cylinder so that the compression, and consequently the temperature, will be lower. Addition of certain chemicals, such as tetra-ethyl lead, to fuels like gasoline tends to raise the ignition point, thus counteracting the lowering of the point of ignition due to pressure of compression.

LIMITS OF INFLAMMABILITY—For every air-gas mixture, there is a certain range of composition outside of which the mixture will not ignite and continue to burn; that is, beyond these limits a mixture of air and gas cannot generate sufficient heat to make the combustion self-sustaining. The lower limit of inflammability represents that mixture of air and gas which is just sufficient to burn without continuous application of heat from an outside source. Beyond the upper limit, the gas itself acts as a diluent to such an extent that there is not sufficient oxygen present to sustain the combustion. Table 8 gives the upper and lower limits of inflammability for various gases.

TABLE 8

Limits of Inflammability of Gases in Air Under Ordinary Atmospheric Conditions*

	Limits in per cent by volume in air	
	Lower Limit	*Upper Limit*
Gas	*Per cent of Gas*	*Per cent of Gas*
Hydrogen	6.2	71.4
Carbon Monoxide	16.3	71.2
Coal Gas	7.0	21.0
Coke Oven Gas	7.0	21.0
Blue Water Gas	12.0	67.0
Blast Furnace Gas	36.0	65.0
Methane	5.8	13.3
Ethane	3.3	10.6
Ethylene	3.4	14.1
Benzene	1.4	5.5
Pentane	1.3	4.0

* From Haslam & Russell,—"Fuels and Their Comoustion," p. 265

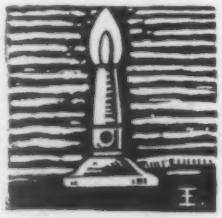
In ordinary processes of gas combustion, burning or ignition takes place at a single point by the application of heat from an external source. The heat developed by this combustion serves to raise the temperature of the mixture to the ignition point and combustion continues so long as the mixture is within the limits of inflammability.

To burn gas effectively, either for lighting or heating, it must be handled through some sort of burner or nozzle. The earliest burners were nothing but open pipe, which of course were smoky, inefficient, and flickering, besides giving a very poor light. The various types of fish-tail burners which were soon developed changed these conditions greatly, since they had the effect of improving the air-gas mixture, and giving a shorter, steadier and hotter flame. The invention of the Bunsen burner followed, due to Bunsen's discovery of the principle of pre-mixing part of the air required for combustion, and this discovery completely revolutionized the process of gas burning.

The Bunsen burner is familiar to everyone, since modifications of it are to be seen on every gas range. Essentially, it consists merely of a tube having a gas inlet at the base and above this, a slot for the admission of air. The flame produced is made up of several distinct zones; the inner greenish-blue cone, the outer violet colored flame and a practically invisible envelope surrounding this. Inside of the blue cone is the unburned mixture of gas and air which is moving forward at the same speed at which the flame is trying to move backward. The greater the velocity of the mixture in the tube, the higher the cone will be, but there is a limit to this velocity. If it is too high, the cold, unburned mixture will blow through, causing the flame to go out or to travel back along the outer edges to the point of entrance of the gas, where it will burn with the characteristic smoky flame. The air slot therefore must be capable of regulation so that mechanical equilibrium is maintained between the burning gas and the forward-moving mixture.

At the very surface of the cone, the gas is first burned to the alcohols and aldehydes corresponding to the composition of the gas. Immediately beyond the cone the products of the hydroxylation are mixing with the air surrounding the flame and completing the combustion to the final products of carbon dioxide, nitrogen, and water vapor. However, if the air supply around the flame is insufficient, considerable carbon monoxide will be formed.

The air which is mixed with a gas before combustion is called primary air, as distinguished from secondary air, which is that supplied around the flame. Both must be controlled. For manufactured gas burners, operating under atmospheric pressure the ratio of 3 parts of air to 1 of gas is about average for primary air. For natural gas, the ratio is about 5½ to 1. As to secondary air, the ratios vary widely. It should be maintained in quantities as near to the minimum as possible, since all excess secondary air represents inert matter which must be heated by the flame and from which only a portion of this heat is recoverable. Too much secondary air, therefore, means considerable loss in heat.



Gas Heating Calculations SIMPLIFIED

Part I - Heat Losses

By O. J. KUENHOLD
Gas Heating Engineer, Forest City Foundries Co.

The need has been expressed for a brief but readily understandable explanation of the technique of gas heating calculations, covering such essentials as gas heating salesmen and engineers should be familiar with, and arranged in a concise, systematic way. In response to that need we have engaged Mr. Kuenhold to prepare this short series of articles, because of his extended experience and the happy faculty he seems to have for making technical matters simple and clear.

Although this series is written so laymen can get a grasp of the subject and apply the methods given, advanced gas heating engineers should find new and valuable information in the series.—EDITOR

Heat Transmission Losses

WHEN the air in any enclosed space, such as a room or house, is warmed to a higher temperature than that of the surrounding air, a thermal pressure or head is set up which causes heat to flow from the warmer air inside, through the outer walls, to the cooler air outside. The amount of heat transmitted through each sq. ft. of outside wall surface per hour depends upon:

(1) The existing thermal head, or temperature difference.
(2) The resistance to heat flow offered by the wall construction.
(3) The velocity at which the outer air moves against the outer wall surfaces.

The rate of heat flow is exactly proportional to the thermal head; that is, at 70 degrees temperature difference between room and outdoor air, 70 times as many B.t.u.'s will be transmitted per sq. ft. hr. as at 1 degree temperature difference.

When wind blows against or across any outside wall or window surface, it "wipes" the heat off and this increases the rate of heat transmission through the wind exposed wall or window surface. The percentage of increase of heat transmission is, however, not exactly proportional to the wind velocity.

As no thermal head exists between rooms of equal temperature, no heat flow takes place through dividing walls unless one room is warmed to higher temperature than the other. All wall, floor, ceiling, and window surfaces of a room which are exposed upon the outer side to lower than room temperature are called "exposed surfaces." The heat which is transmitted from the room through exposed surfaces is called a "transmission loss."

The temperature of air in a room will be higher at the ceiling than at the floor and the air temperature toward outside walls will be a few degrees lower than the air toward inside walls, but in calculating the heat transmission, we assume average room temperature and hence average heat flow. The air at a first floor ceiling will, in cold weather, be about 20 degrees higher than the air at the floor above. Actually a heat flow will take place, since a thermal head exists, but we ignore this, because whatever heat is transmitted through the floor of a room is approximately offset by the head flow through the ceiling of the same room. However, in cases where the heat which is put into a room is at unduly high temperature, stratification of over-heated air takes place at the ceiling and this causes higher heat losses than calculated upon the above average room temperature assumption.

Wind Losses

The increased rate of heat transmission through the walls, windows, etc., which is caused by air movement against or across outside surfaces, is commonly called a "wind loss," because the extra percentage of heat transmission is present only when there is a wind. It is now universal practice to assume air movement of 15 miles per hour against all outer surfaces of a house and to add 15 per cent additional to the heat transmission losses of wall and window surfaces against or across which any commonly prevailing mid-winter winds may blow. Such walls and windows are called "windward" walls and windows. Usually from two to three of the four walls of a house are windward walls. The remaining wall or walls, as the case may be, are called "leeward" walls.

In calculating heat losses of a room or house, make certain of prevailing winter wind directions and the directions toward which the walls face.

Infiltration Losses

Besides the increased rate of heat transmission, due to wind, there is another loss caused by wind. When wind blows against a house it increases the atmospheric pressure on the windward side of the house and decreases the atmospheric pressure on the leeward side of the house. This difference in pressure causes air to infilter at cracks etc., on the windward side and exfilter at the leeward side. This infiltered air becomes warmed to room temperature and "drifts" across the house to the leeward side where it exfilters. When this air exfilters it carries heat out of the room and this is a heat loss. The actual heat loss takes place at the leeward side of the house, but an equivalent amount of heat must be added to the infiltering air at windward rooms; therefore, in calculating it as a loss, the loss is considered as occurring at the windward side. This will be explained more fully under "window losses."

There are two methods in use for calculating the heat loss due to infiltration; one is to assume that one or more air changes per hour occur in each room, according to how many exposed walls it has, and the other is to measure the window and door crack length, and assume a given number of cubic feet of air infiltered per foot of crack. The former method is erroneous because the cubic contents of rooms, and the

second method is erroneous for reasons which shall be explained. Both of the above methods require a special calculation for each room, which is unnecessary.

The infiltration occurring through walls is of insignificant amount and may be ignored. The only places in a well built house where any infiltration of consequence occurs is at windows and door cracks. The following new method for calculating infiltration losses is much more accurate than the methods in common use, is simpler to understand and saves an enormous amount of time. It is accomplished by combining window infiltration losses with window transmission losses.

Window Losses

The heat losses assigned to windward windows are of two kinds; (1) heat transmission outwardly through the window frame and glass, and (2) the heat which must be added to warm the infiltering air to room temperature so as to offset its room cooling effect. The air which leaks in at windward window cracks blows across and parallel to the window. In so doing it prevents the air at room temperature from contacting with a considerable area of the window. The greater the velocity of the in-leaking air, the greater is this blanketed area. Window shades and curtains help this action. The result is that the aver-

HEAT LOSS TABLE

For Residences — Including Infiltration

CONSTRUCTION

Pl.—½″ plaster; WL—wood lath; Shtg.—1″ sheathing; Insul.—insulation

Item No.		BTU per Sq. Ft. Hr. @ 70 deg. Temp. Diff.			
		Leeward		Windward	
		Wall	Window	Wall	Window
	Walls	A	B	C	D
1	Frame—Clapboard or Shingle on Shtg. Pl. on WL	19	61	21	104
1A	Same as 1 except Pl. on ½″ rigid insul.	14	66	16	109
1B	Same as 1 except add ½″ flexible insul. between studding	11	69	13	112
2	Frame—Stucco on Shtg. Pl. on WL	21	59	25	100
2A	Same as 2 except Pl. on ½″ rigid insul.	16	64	18	107
2B	Same as 2 except add ½″ flexible insul. between studding	12	68	14	111
3	Eight Inch Brick unplastered	27	53	35	90
3A	Eight Inch Brick Pl. inside on brick	25	55	29	96
3B	Eight Inch Brick Pl. on WL furred	18	62	20	105
3C	Eight Inch Brick Pl. on ½″ rigid insul. furred	14	66	16	109
4	Twelve Inch Brick unplastered	21	59	27	98
4A	Twelve Inch Brick Pl. inside on brick	20	60	23	102
4B	Twelve Inch Brick Pl. on WL furred	15	65	17	108
4C	Twelve Inch Brick Pl. on ½″ rigid insul. furred	12	68	14	111
5	Veneer Four Inch Brick or Stone—Shtg. studs Pl. on WL	18	62	20	105
5A	Same as 5 except Pl. on ½″ rigid insul.	14	66	16	109
6	Stucco on Hollow Tile Pl. on Tile	21	59	24	101
6A	Same as 6 except Pl. on WL furred	16	64	18	107
6B	Same as 6 except Pl. on ½″ rigid insul. furred	12	68	14	111
7	Matched Sheathing on open studs—Add percentage for leakage	35	45	41	84
	Ceiling Under Roof	Ceiling	Skylight		
8	Wood Shingle on wood strips, rafters Ceiling Pl. on WL	21	59		
8A	Same as 8 except Pl. on ½″ rigid insul.	15	65		
9	Slate or Tile Shingles on shtg. Paper Ceiling Pl. on WL	22	58		
9A	Same as 9 except Pl. on ½″ rigid insul. below rafters	16	64		
9B	Same as 9 except add ½″ flex. insul. between rafters	12	68		
10	Roofing on 1″ shtg. Open rafters below	34	46		
10A	Same as 10 except add matched ceiling or Pl. on WL ceiling	22	58		
	Ceiling Below Unheated Attic		Wall Loss Deducted		Wall Loss Deducted
11	Wood Shingle on strips. Open rafters. No floor. Ceiling Pl. on WL	19			
11A	Same as 11 except attic floored with wood or ½″ rigid insul.	12			
11B	Same as 11A except attic Pl. on WL	10			
11C	Same as 11A except ceiling Pl. on ½″ rigid insul.	10			
12	Slate or Tile on shtg. Paper. Open rafters. No. floor. Pl. on WL	20			
12A	Same as 12 except attic floored with wood or ½″ rigid insul.	13			
12B	Same as 12A except attic Pl. on WL	10			
12C	Same as 12A except ceiling Pl. on ½″ rigid insul.	10			
	Floors				
13	1″ Flooring on open joists below	31			
13A	Same as 13 except joists Pl. below on WL	19			
13B	Same as 13A except add ½″ flex. insul. between joists	14			
	Glass				
14	Single glass residence windows. Transmission plus infiltration	net 80			net 125
15	For double glass panes—deduct from glass factors above	27			30

Caution—Gross Wall areas must be used with this table.

age temperature of the air coming into contact with the glass is reduced. This reduces the existing thermal head and consequently the volume of heat transmission outwardly through the glass.

The reducing effect which inward filtration of air has upon outward transmission of heat makes it logical to consider both these sources of heat loss under one heading i.e. window losses; in fact, accuracy can be achieved in no other way. By assuming an average active crack length of 1 ft. per sq. ft. of window casement opening, it is easy to combine the two losses. Careful analysis shows that an allowance of 125 B.t.u.'s per sq. ft. will cover both losses, assuming that the window is locked and fitted fairly tight, as it should be.

At leeward windows the situation is quite different. The air leaks outwardly through the cracks instead of inwardly. The air which passes out is air from the vicinity of the window which has been cooled to about floor temperature or less. The heat lost in this way must not again be calculated as a loss for it has already been accounted for as a loss where the cold air filtered in on the windward side.

Taking all influences into consideration, the leeward window loss is 60 B.t.u.'s per sq. ft. of window casement opening, but to allow for "breathing" at leeward windows and possibility of a wind from unusual direction, it is best to assume 80 B.t.u.'s per sq. ft. as the total leeward window loss.

Allowance for Outside Doors

Infiltration occurring at outside, windward door cracks blows directly into the room, but wood doors transmit half as much heat per sq. ft. as glass; the door cracks, while wider, average less than a foot per sq. ft. of door. We can therefore safely treat outside doors the same as if they were windows.

The above logical method of combining infiltration losses with window and door transmission losses eliminates all cu. ft. calculations and reduces the process to simply finding windward window and net wall areas, leeward window and net wall areas, and exposed ceiling or floor area—then multiplying each area by the heat losses per sq. ft. per hr. and adding the products. But this method can be still further simplified as shall be explained.

In finding net wall areas, the window area in each wall is subtracted from the "gross" wall area (length times height) in order to get the "net" wall area. This extra calculation can be eliminated by employing "gross" instead of "net" wall area and then using a window loss factor which is the window loss per sq. ft. hr., less the wall loss per sq. ft. hr. In other words, the window loss factor to be employed will be that portion of the window loss per sq. ft. hr. which is over and above the wall loss per sq. ft. hr. This will be made more clear in the following.

The Heat Loss Table

In calculating the heat losses for a room or house, certain worst weather conditions are assumed, though not an exceptionally severe and rarely occurring combination of wind and weather. The most common assumption is to assume the rooms warmed to 70 degrees in zero weather, i.e. 70 degrees thermal head—also called 70 degrees of heating.

The Heat Loss Table lists the most common types of wall, floor, and ceiling or roof constructions To the left of each type of construction are given the losses per sq. ft. hr. for respectively: leeward wall, leeward window, windward wall, and windward window in columns A. B, C, and D. The losses given are for 70 degrees of heating. The window loss factors given are actual window loss, less wall loss, per sq. ft., therefore, gross wall areas must be employed in calculating wall losses.

The following example illustrates the simple process to which the computation of total heat losses of a room has been reduced. It assumes a 10 x 15 ft. room, 10 ft high; the 15 ft. wall being to leeward and having a 30 sq. ft. window, the 10 ft. wall being to windward and having a 20 sq. ft. window. The wall construction is as in item 5 and the ceiling as in item 11A of the Heat Loss Table. The space below the floor is assumed to be heated.

Leeward wall	150 sq. ft. gross	×	18	equals	2,700 BTU's.
Leeward window	30 sq. ft. gross	×	62	equals	1,860 BTU's.
Windward wall	100 sq. ft. gross	×	20	equals	2,000 BTU's.
Windward window	20 sq. ft. gross	×	105	equals	2,100 BTU's.
Ceiling	150 sq. ft. gross	×	12	equals	1,800 BTU's.
Total, including infiltration				equals	10,400 BTU's.

This method reduces chances for errors and almost cuts the time required to calculate the losses in half.

Measure rooms center to center of joists vertically and center to center of end walls horizontally. Measure windows inside of casement opening and regard doors the same as windows. For stair halls compute losses for all exposed surfaces on first and second floor and add 15 to 20 per cent stair draft and height factor. Sun-rooms having unusually large glass exposure require 10 to 20 extra B.t.u.'s per sq. ft. added to window losses to counteract "cold radiation" and stray currents.

Be sure of prevailing winter wind direction and the direction in which the walls face. Watch out for floors over open porches or unheated garages, or under unheated attic space.

Walls Adjoining Unheated Space

Unheated rooms which adjoin heated rooms will be partly warmed by heat transmitted through the intervening wall. The heat transmitted per sq. ft. will depend upon the existing thermal head. To find approximately what the thermal head between the two rooms will be, proceed as follows: Find heat losses through all exposed surfaces of the unheated room if it were heated to 70. Call this amount "A." Find what the heat losses would be from the heated room through the adjoining wall if the unheated room were at zero. Call this amount "B." The thermal head between the two rooms will be $\frac{A}{(A+B)} \times 70$. The actual heat loss through the wall adjoining the unheated room should then be calculated on that basis. An assumption that the temperature in the unheated room is 70 degrees less 25 per cent for each exposed wall is usually of ample accuracy.

Basements—The heat transmitted into basements of residences from the warm air ducts and furnace are usually of such amount as to warm the entire basement to room temperature. No heat losses need there-

fore be assumed through floors of first floor rooms, unless they are over a room separated from the rest of the basement space by tightly enclosed walls, and having larger than usual glass exposure. In such cases the separated basement rooms are usually warmed to at least 60 degrees through adjoining walls and the floor above. In radiator systems with well covered pipes and gas boiler, the temperature of separated basement rooms tends to be a little lower. Unless no heat source exists in the basement, first floor losses to the basement, if any, are generally so small that they may be disregarded. An assumption of 30 degrees thermal head through floors over unheated basement is usually of ample accuracy.

Required Heating Capacity

To maintain the calculated room temperature in assumed worst weather, the volume of heat input for the rooms per hour must equal the total heat input into the rooms per hour. If greater or less room heating than the usually assumed 70 degrees is to be done, add or subtract 1/70th for each degree over or under. It is usual to add 1/7th to bath-room heat losses, which, taking inside walls into account, will result in 7 or 8 degrees increased temperature.

The room heat input may originate from heaters or radiators placed in the room, or from heat units carried into the room by heated air from warm air ducts. The total calculated heat losses represent the heat volume required to be put into the rooms to hold or maintain the designed temperature. It does not include reserve capacity which must be added for leeway and to provide flexibility of heat control and quick pickup after the heat has been turned down, for instance, during the night. The percentage of reserve capacity which must be added depends upon circumstances and the type of heating system employed. This requires careful consideration and will be fully discussed in the next article in this series entitled, "Selecting the Heating Appliance."

Instant Heat Loss Calculations

Although the method given above is extremely rapid, occasions often arise where a close approximation of the heat losses is necessary in a few seconds. If the house is of usual frame, brick, or veneer construction, with window areas not over one-eighth of the wall surface, and average ceiling height, the following rules give the required *room input,* without allowance for pickup:

(1) *Two story house:* Outside wall perimeter in ft. times 700 B.T.U.'s.

(2) *One story house:* Outside wall perimeter in ft. times 400 B.T.U.'s.

(3) *First floor suites* if individually heated: Same as (2) but add one third of dividing wall length between suites, if any.

(4) *Upper floor suites* if individually heated: Outside wall perimeter plus one third the length of dividing wall, times 440 B.T.U.'s.

(5) *Individual rooms*: Same as (3) or (4), according to location.

(6) *Two story side-by-side suites:* Same as (1) except add one third of dividing wall between suites.

The above gives the approximate room input required to maintain a 70 degree thermal head. Add pickup percentage, then add one-fourth to get the required B.T.U. output of central furnace or boiler. To this add one third to get furnace or boiler input. In the case of individually heated suites, an allowance is included in the above for possible vacancy in abutting suites. Remember that the above is approximate.

The heat loss calculations above described have for their object the maximum heat input requirements under assumed extreme combination of wind and weather. These losses should not be employed for finding fuel consumption. The latter will be explained under the above heading in a future section of this series.

Subsequent sections will include fuel cost calculation, required radiator duct or heater capacities central heater capacity, and the technique of warm air heating, including forced circulation and air conditioning systems.

Gas Mixing in Syracuse

(Continued from page 18)

gas. I do not now believe that any customer complaints can be attributed to faulty mixing.

We have made numerous changes in the connections about the plant, requiring much manipulation of valves and starting up and shutting down of equipment including the Mixing Plant. We have occasionally sent out for short periods gas differing materially in heating value from the 875 B.t.u. standard. We have no record of any complaints that resulted from such a condition. The length of such periods as indicated by the calorimeter chart probably averaged from ten to twelve minutes. It is interesting to note that while such departures from the standard heating value are clearly evident on the recording calorimeter at the works, a similar calorimeter about one and one-half miles from the plant frequently fails to show any change in B.t.u. content or at the most only 5 to 8 B.t.u.'s. There seems to indicate a very considerable ironing out in the main system.

In normal operation, the curves drawn by the two calorimeters are practically identical and if the effect of wide changes in heating value were carried throughout the system I would expect that evidence of them would be shown on the charts of both instruments. My only purpose in bringing up this point is to ease the minds of those who feel as I did, that sudden changes of considerable magnitude, in the heating value of a gas would cause unfavorable conditions on the customers' appliances. Apparently, this is not the case.

Gas Exhibits at the Century of Progress Exposition

The Gas Industry Exhibit—Portraying the manufacture, production, distribution and utilization of manufactured and natural gas.

Addressograph-Multigraph Corporation—Accounting machines.

American Radiator Company—Showing boilers, househeating furnaces, radiators, water heaters, air conditioning units and sanitary equipment.

American Stove Company—Portraying history of domestic cooking and showing latest styles in gas ranges.

Bryant Heater & Mfg. Co.—Gas fired boilers and air conditioning equipment in model basement.

Burroughs Adding Machine Company—Accounting machines and office equipment.

Crane Company—Valves and fittings.

(Continued on page 27)

Can You REMEMBER When-?

Mr. I. W. Peffly sailed from New York not long ago for a two months' trip through Europe, during which he will visit London, Paris, Berlin, Vienna, etc. While the trip is in the main a vacation outing it may be taken for granted that very little in the way of "newness" regarding gas ranges and the like will escape "Peff's" range-of-vision, so to speak.—*American Gas-Light Journal, August 25, 1913.*

We are indebted to Secretary Britton, of the Pacific Coast Gas Association, for the following mention respecting the banquet enjoyed by the members and guests at the Maison Riche:

"After adjournment on the afternoon of the first day (July 11th), the members met at the Maison Riche, as guests of the San Francisco Gas Light Company, and did ample justice to the elegant spread prepared for them. In explanation of the seal of the Association, unique in its way, Mr. E. C. Jones stated that it was designed from a form made by his father in the early days of gas lighting in Massachusetts, and represented a perfect circulation of gas—no dead ends, the ultimate aim and object of every gas man—and that the burner in the center of the seal was emblematic of the point that every gas engineer works to—the ignition of the gas. The unanimous thanks of the Association were tendered to Messrs. Jones and Crockett and to the San Francisco Gas Light Company, for their efforts to make, and their zeal in making the Pacific Coast Gas Association a success. The morning sun, which had awakened the Eastern gas men many hours before, was coming over the Sierra Nevadas before the congratulation to and the baptism of the new infant had been fully accomplished."—*American Gas Light Journal, August 7, 1893.*

The illustration shows how the works of the East St. Louis (Ills.) Company were situated during the trying times of the floods occasioned by the Mississippi river failing to properly assimilate the torrents that were poured into it early last June in the neighborhood of St. Louis, Mo. The illustration is reproduced from a photograph taken by Miss Lilian Maguire, daughter of Mr. Henry Maguire, General Manager of the East St. Louis Plant. — *American Gas Light Journal, July 20, 1903.*

HOLLYWOOD SPEAKS— *in Window Displays*

By STUART BRATESMAN

Manager, Display Dept., Boston Consolidated Gas Co.

I'M NO MOVIE STAR...
so my "statement" isn't paid for but I insist on giving it...every home to my mind, should have lots of hot water on hand at all hours. Gas furnishes all you can use at low cost

The big style shops of New York and other large cities are quick to follow any new exaggerated fad in clothes, hats and shoes conceived by the master designers of individualism hired by the big California studios. If a favorite movie star comes out in her latest picture wearing some ridiculously different gown or hat, right away millions of women from all parts of the country rush to the stores and shops and purchase the articles for themselves. There is no doubt about it, Hollywood has a lot to say about how America dresses, acts and thinks.

Have you ever stopped to consider how this tremendous interest and influence can be utilized to sell modern gas appliances in window displays? The interest aroused by displays having a Hollywood theme is surprising. The messages you endeavor to convey by this method will reach thousands of people, right

WE hear a lot today about motion pictures entitled, "Africa Speaks," "Mussolini Speaks," and "India Speaks"—why not "Hollywood Speaks," and adapt it to the modern merchandising of gas appliances in window displays?

You can criticize Hollywood all you want, heap coals of abuse and ridicule on its products, but you must admit that it exercises one of the most tremendous influences on American life today. Literally millions of people cling to every new fad that emerges from its studios. It has a far-reaching effect on thousands of families. These families, especially in the suburbs or small towns, take one or more nights off each week and "take-in" the current attraction at the local movie palace, regularly. These very same families are the ones that purchase lasting gas appliances for their homes.

AS HOLLYWOOD SAYS
"AND THEY LIVED HAPPILY EVER AFTER"...
This spring gas range prices are way down
Ask any woman who cooks with about its superior speed

in your own territory, who heretofore merely glanced at your windows.

Now, when we adapt a theme like the motion pictures to the problem of selling gas appliances in window displays the first question that arises is, "how shall we do it and not make a ridiculous, lurid blurb of the subject, as Hollywood so often does?" With the thought in mind of getting as far away as possible from the "star" type of meaningless testimonials and posed publicity photographs, the theme of Hollywood can be intelligently adapted to selling merchandise of any kind to the public.

The two examples shown on these pages will bear out this statement. Here is the movie theme in gas appliance window displays. There can be no objections to the manner in which the Hollywood ideas are presented in these advertisements, either from within your own organization or from the person on the sidewalk. Remember, we cannot afford to offend people in advertising today. Our job is to sell our products to *all* people who read our advertisements. If we presented Hollywood to the gas appliance buying public like Hollywood presents its products to the picture-going public we'd have a storm of criticism on our heads, and rightly so.

In preparing these two window displays, the method generally used, that of featuring the name of some current star, was discarded because of the red tape entailed in securing permission, and the general belief, among intelligent people, that these testimonials and posed photographs are nothing more than another way to get the star in front of the reading public. In fact, the display with the housewife making the direct statement, "I'm no movie star . . ." sort of burlesques this overdone publicity stunt.

The really intelligent way to utilize Hollywood's far-reaching influence in gas appliance merchandising is to break away from the blurb type of advertising with ideas like the two shown on these pages. The interest aroused in the right direction will clearly manifest itself. Try some in your windows and see for yourself.

Notes on High Pressure Gas Distribution

(Continued from page 15)

variation necessary on a low pressure system to take care of peak load conditions is carried directly to the appliance, but on high pressure not beyond the regulator. An important but indirect effect, seldom recognized by consumers, is the attainment of better combustion by a minimum variation of pressure at the burner, thus diminishing the ill effects of non-vented appliances and decreased consumption. The total number of complaints, however, is not decreased to the total number of such trouble eliminations, as the decrease in appliance complaints is somewhat offset by complaints originating within house regulators.

Directly affecting service to the consumer and also facilitating the handling of appliance adjustment complaints is the possibility of regulating burners at any time of the day with the assurance that the regulation will remain constant during the hours of most frequent use when proper adjustment is most appreciated. In a low pressure district, adjustments made at any time except the hour of peak system demand might result in unsatisfactory combustion when service is most required.

Experience has demonstrated that a break in a high pressure main seldom causes a complete outage of gas, as sufficient pressure often remains to maintain service until a small section of main can be valved off or temporarily repaired. The ability to temporarily maintain the load has eliminated the considerable expense of shutting off the district, notifying consumers, shutting off each service, turning on mains and re-establishing service into the consumer's residence. Minor breaks and leaks occur with no inconvenience to consumers. Temporary repairs are accomplished without shutting down the line. Permanent repairs can then wait for a more convenient time or the necessary material, and may be completed without discontinuing the transmission of gas.

The numerous advantages of partially dehydrated gas are inexpensively obtained with high pressure by compressing to higher pressures than necessary for transmitting and condensing and lowering the pressure to that required on the transmission line or distribution system. On many systems, where the gas must be transmitted for several miles before serving any consumers, it is unnecessary to over-compress, as the condensing effect of the main together with the drop in pressure brings the dew point to a temperature lower than any to which the gas will be subjected in the remainder of its travels. In this latter case it is necessary to install drips on the transmission line only to the point where experience proves that there will be no further condensation. The dehydration eliminates stoppages from condensates and naphthalene.

(Continued in July issue)

Exhibits at Century of Progress

(Continued from page 24)

Electrolux Refrigerator Sales, Inc.—Gas fired air-cooled refrigerators, water coolers, commercial units.

Faraday Refrigerator Corp.—Gas fired domestic refrigerators.

Holland Furnace Company—Househeating furnaces, some equipped with gas burners.

International Business Machines Corp.—Accounting machines and office equipment.

Johns-Manville Company—Material and supplies for use in construction of homes and buildings.

Model Homes—The following model homes are completely or partially gas equipped, with ranges, water heaters, refrigerators, and central heating plants: Masonite; Lumber Industries; Common Brick; American Rolling Mill; Moore; Strandsteel; General Houses; Florida.

National Tube Company—Steel pipe and fittings.

Petroleum Heat and Power Company—Gas fired househeating conversion burner.

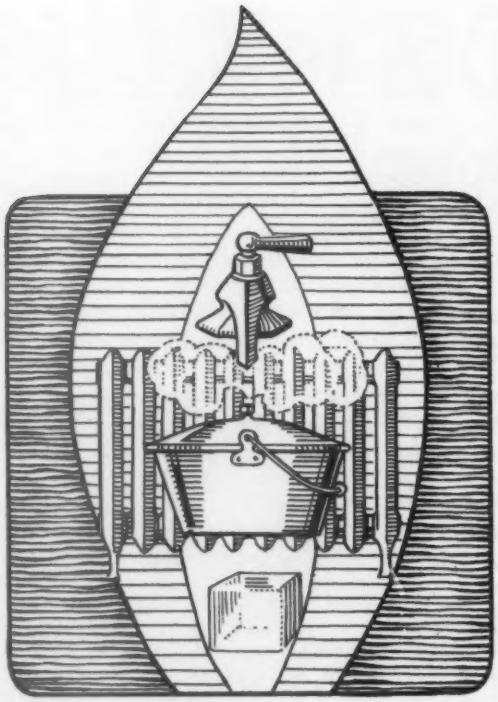
Pittsburgh Equitable Meter Company—Meters, controls and regulators.

Porcelain Enamel Parade—Will include ranges and parts by: A-B Stove Company; Cribben & Sexton Company; Crown Stove Works; Eagle Foundry Company; Oakland Foundry Company; Republic Steel Corp.

Surface Combustion Corporation—Gas fired househeating furnace, water heaters, unit heaters.

Underwood-Elliott-Fisher Company—Depicting progress made in office products during the last century.

Union Carbide & Carbon Corporation—Bottled gases; a model kitchen showing use of bottled gas.



PROFITABLE POINTERS

AS we view it, production has hit its stride and gas men may leave it as it is now, in competent hands. The gas man's job is to get his grey matter to working on the problem of distribution and the study of markets. In short, we are of the opinion that the greater per cent of so called retailers are off their orb. There is no rhyme or reason why all our engineering and otherwise skilled talents should devote all of their time to the production end of the business while distribution and the ultimate consumer are left upon their own. It seems that many highly paid executives have *got* "the cart before the horse." It is our opinion that we have, to use the language of Hon. Ramsey Macdonald, *got* to get this procedure revised if we are to make any appreciable advance as merchandisers.

GAS company advertising certainly has been treated like a step-child during the past three or four years, and it is our opinion that that is one of the reasons why a number of gas men seem to be disturbed about the cooking load. Managers, being asked to reduce expenses, grabbed hold of a financial statement and ran their fingers down the column until they came to the account, "Advertising Supplies and Expense" and there made their start to reduce. Thus the advertising budget was given a good kick in the pants and, as a result, "staples" like gas ranges needed no advertising, and — well, you know the answer. We predict that those companies who go ahead from now on are going to be managed by men who are advertising - merchandise-sales minded. Read and study the history of the industry. Was it not just that type of executives who built it?

STUDY this picture of a Consolidated Gas Company store that is staging a sale of gas water heaters.

There is the idea; when you stage a sale of ranges, water heaters, refrigerators, or house furnaces, build a floor display that says "here they are." If you entered this store after having seen some of that very effective gas water heater advertising or one of Ray Martin's window display advertising windows, you would feel, "well there's something to this Gas water heater business," and no doubt you would stand hitched long enough to permit a salesman to demonstrate the fact that automatic hot water service is desirable. Try a mass display on the floor of the store the next time you are driving to put over an appliance.

HERE'S a story that may provide a reason why for cooking with gas: A customer received a gas bill for one month for $3.50. Due to the fact that business was bad, or for some other reason that had nothing to do with the cost of gas, he thought it out of all reason. He went down to the gas company and staged a storm. The more he stormed the more courteously the clerk tried to reason with him—but to no avail. He ordered the gas shut off—and stormed out of the gas office. He purchased a gasoline stove,—for which he paid $65.00—"and" he is quoted as saying, "I now cook for $1.50 per month, the amount I pay for oil". Isn't it strange how some folks figure? We wonder who he thinks pays out that $5.42 per month, to say nothing of hazard and interest on investment and depreciation.

MANY good sales promotion plans have gone hay-wire for the simple reason that the retailer failed to follow through on the advertising plan set up by the producer of the product. In such a case newspaper and direct mail advertising having been used to arouse interest, the dealer then failed to build an attractive window display advertisement tie-in, and also neglected to arrange a store display after the fashion of a true showman. Store and window displays are both very important factors in any sales drive. They say "here is the merchandise we have been telling you about; here, look it over and place your order."

ONE-hundred-and-fifty-watt lamps will pay a higher dividend than those of sixty or seventy-

five watts when used to illuminate window display advertising. Home appliance dealers above all others should know that it pays to throw a lot of light upon the wares they offer for sale.

DESPITE the depression, this year's crop of New Home Managers is reported to be up to average. Gas men who honestly intend to retain the cooking and water heating load will do well to lay siege to the new home market.

THE fly season is right upon us. What are you going to do to sell those incinerators you have hidden in the store room? Why not use some small space advertisements forthwith and also build a window display advertisement featuring GAS incineration—you'll never sell 'em until you expose 'em to sales.

THE more we hear about plans where the salesman calls on a consumer to "present" something, whether it be a service of adjusting an appliance or the delivery of a cook book, the better we think of the idea. Just today a man who sells electric mixers, and whose company has worked out a plan whereby the consumer is presented a cook book and the salesman who delivers the book asks for permission to make a demonstration, told this writer that fifty per cent of the secured demonstrations result in sales. That is a pretty high average but the idea is certainly a worthwhile one.

OUT where big stars are made, in California, gas men also do things in a big way. When the Gas Appliance Society of California staged their drive to modernize the kitchen on May first eighty towns laid down a barrage of advertising that would make the oldest inhabitant sit up and take notice. Posterboards, cards, direct mail, newspaper, truck banner and radio advertising were all enlisted to acquaint the coast with the convenience of GAS cookery. And to top it all off, Governor James Rolph, Jr., sent the society a wish for success. SALES people who have a pleasant word, a smile, a friendly greeting are the ones who make the cash register ring and keep the customer sold.

ONE salesmanager found that his men wasted a great deal of time in telling women about the construction features of gas ranges; and when he changed their selling talk to one predicated on "what it will do for you," the orders increased.

IT is a bit early to talk about gas home heating, yet we want to pass on a "Heat With Gas" advertisement used by the Minneapolis Gas Light Company that should find a place in your Home Heating Idea file. We like the style of this advertisement; clean, effectively illustrated and laid out, with an effective sales message.

***This was not in the* marriage vows**

DID you promise to love, honor and obey . . . and to do the janitor's work around the house?

No, of course not! And that is another reason why, gas, the modern fuel, is gradually replacing all other fuels, as the perfect automatic heat for a residence Wives, mothers and daughters do not like to shovel ashes, juggle dampers and drafts, to climb up and down stairs for many a weary mile, tending the furnace.

And the surprising part is that gas heat really is economical. With the reduced rates now in effect in Minneapolis, you cannot afford to be without gas heat. Then you can relax and enjoy real comfort. A thermostat will do the janitor work. All you will have to do is to wind a clock, once a week. Your gas company, each year before winter arrives, sends a crew to completely check over your heating system, and get ready for cold weather

Telephone Main 0321 today, for an accurate estimate of what it will cost to use gas heat, in your home. It will not cost you a single penny, to get these facts. Also, it is a simple, easy matter to install gas heat

No fuss, no dirt, no bother Minneapolis Gas Light Company, Hennepin Avenue at Eighth Street

• • • •

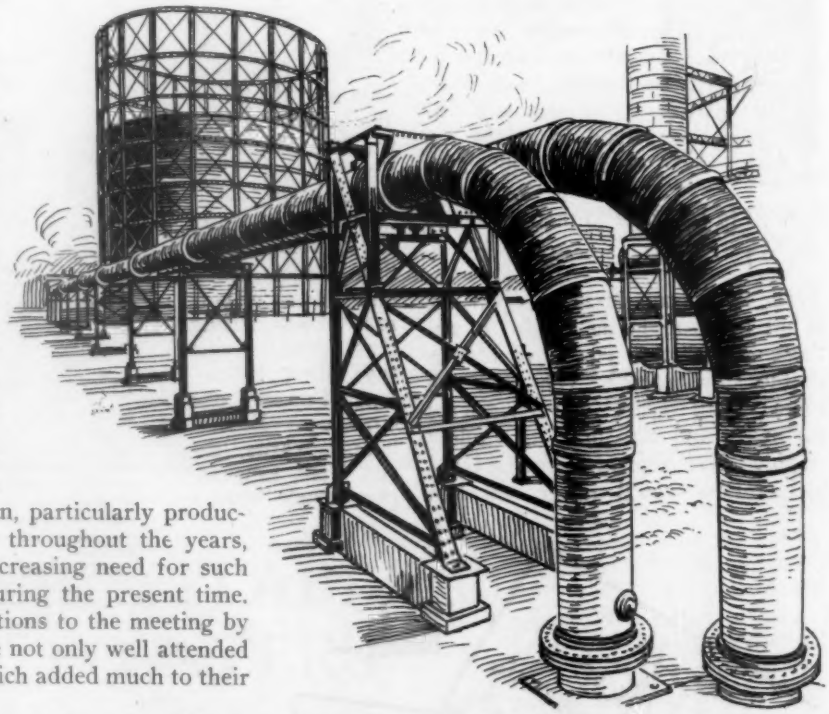
HEAT WITH GAS

WHEN women purchase home appliances today they look for value. If you make your appeal to reason you will go far. We do not mean to imply that you cannot appeal to emotions, yet we do maintain that there are not nearly as many folks interested in keeping up with the Jones's today as there are those who are interested in securing dollar value.

SELLING on the links is just as dead as high-pressure selling. The gas man who expects to keep his cooking load will have to do his driving a bit closer to the modern gas range, either in the home of the consumer or on the floor of his store.

Production and Chemical Conference Holds Successful Meeting

THE upwards of three hundred gas men who were in attendance at the Joint Committee Conference of the Production and Chemical Committees of the American Gas Association in New York, May 22nd and 23rd, not only were favored with a number of high-grade papers and addresses on pertinent problems, but unquestionably derived more than passing benefit from the excellent discussions which acompanied these papers. Among those who contributed much information of value by way of discussion were: Messrs. Perry, Seil, Dashiell, Huff, Downing and many others.



Alexander Forward, Managing Director, A.G.A., in a short address spoke of the valuable ideas the technical man, particularly production men, have given to the industry throughout the years, and he felt that there would be an increasing need for such ideas from these men, particularly during the present time. President Hewitt tendered his felicitations to the meeting by way of a telegram. The sessions were not only well attended but were prompt in getting started, which added much to their effectiveness and value.

The meetings were very efficiently presided over by Messrs. E. J. Murphy, Brooklyn Union Gas Company and P. E. Eddy, Peoples Gas Light & Coke Company. Last but not least, Mr. Hugh Hartman from Association Headquarters contributed much to the success of this very fine meeting. Below follow portions of several of the papers:

High B. T. U. Gas Test at Philadelphia, Pa. Using Heavy Oil

By W. K. Beard

Philadelphia Gas Works Company

IN the early part of 1931 our Production Department was asked to make a 620 B.t.u. carburetted water gas using heavy oil, and in May of the same year was asked to repeat these tests making a 7000 B.t.u. gas. The oil used was the regular Bunker C oil being generally used in water gas manufacture in Philadelphia, giving an oil efficiency on the Laboratory furnace of about 95,000 B.t.u. per gallon. It had a gravity of 14.5 degrees Beaume, viscosity 60 cc at 50 degrees Centigrade, Furol, of 298 seconds, and a coke content of 8.2%. During the month in which these 700 B.t.u. tests were made, the fuel was at times hot coke from horizontal retorts and in other cases cold coke from coke ovens. Various methods and cycles of operation were used, the most successful of which gave the following results for a four days continuous run on oven coke:

Fuel, lbs. per M.	17.3
Oil, gals. per M.	5.75
B.t.u. in finished gas	716
Specific Gravity, finished gas	0.69

The running conditions were generally the same as those used in the ordinary manufacture of water gas with slight modification due to the extra amount of oil used. Somewhat over 60% of the oil was admitted to the generator top and the remainder to the carburettor. The tar made was very satisfactory, the carbon content being markedly less than that of the tar we are now producing in the manufacture of a 530 B.t.u. gas.

A typical gas analysis is as follows:

Illuminants	17.8
CO	22.5
Hydrogen	33.0
CH_4	12.6
C_2H_6	3.4
CO_2	4.2
O_2	.9
N_2	5.6
	100.0

A split up of this analysis by the Pacific Coast method shows that 57.3% of the carburetted water gas was blue gas having a heating value of 278 B.t.u. and 35.9% was oil gas having a heating value of 1603 B.t.u., the remainder being air and products of combustion.

One method of comparing the efficiency of water gas sets from day to day, which we have used in Philadelphia, has been to multiply the gallons of oil per thousand by 10, and add to this the generator fuel in lbs. per thousand. This is a rough way of determining the heat input on the assumption that one gallon of oil has ten times the heating value of a pound of generator fuel. If we divide the sum of the two by the heating value of the gas we get a figure which is a measure of the thermal efficiency. The lower the dividend, the higher the efficiency.

We were able to make a 716 B.t.u. carburetted water gas at slightly lower cost per therm for fuel and oil than we are regularly making a 530 B.t.u. gas at the present time.

At the conclusion of these tests we decided that it is perfectly feasible to make a water gas of this heating value with the use of heavy oil without any trouble from smoke, tar, or other conditions, with no modification in the construction of the set and only minor changes in the operating conditions and further work was postponed until and as the necessity for commercially making such gas should arise. How much richer gas can be made has not been proven, but we have every reason to believe that we could increase the heating value very materially without any serious difficulty.

Use of Unfluffed Ores for Dry Purification

By C. O. Schobel

Consolidated Gas Electric Light and Power Company of Baltimore

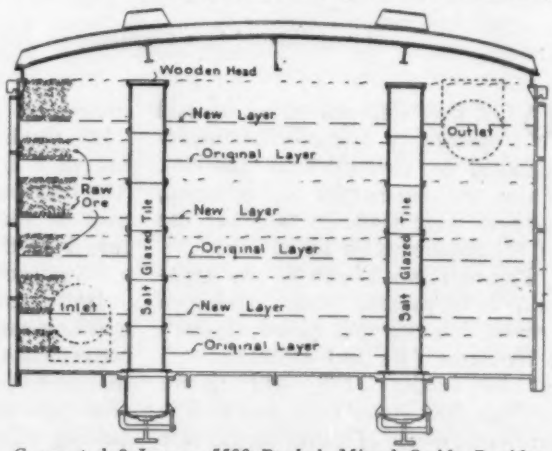
THE problem thus far presented to us is one of simple substitution of raw ore for the fluffed material. Our experience thus far indicates that this practice is not sufficiently flexible to justify its unqualified acceptance under all operating conditions.

We began using raw ore in Baltimore a little less than three years ago for the partial purification of high sulphur content refinery oil gas. Our experience in this respect has furnished a background for our present study, since we have been able to obtain from 95 to 100% removal from volumes of 1500 M to 3000 M cu.ft. per day. The gas contains anywhere from 2000 to 5000 grains of H_2S per C cu.ft. It might be well to add that we commenced purifying this gas with fluffed oxide but were practically forced to abandon its use shortly afterwards. This was due primarily to our inability to handle the mixing, revivifying and final disposal of the vast quantity of materials required. Needless to say, we were also confronted with serious problems in connection with emptying the boxes filled with the highly fouled inflammable material.

In addition to overcoming these obstacles the use of unruffed ore particularly appealed to us as a method by which our purification capacity might be increased with a small capital expenditure.

The accompanying sketch illustrates how one ot our regular three (3'3" deep each) layer mixed oxide boxes was converted for use as a six layer (8" minimum depth each) raw ore box in the refinery oil gas purification system. Essentially, the only changes required in this conversion were the provision of lugs and beams as a means of support for the three additional layers of trays. Several of these boxes have been in service sufficiently long to demonstrate their practicability.

Most of our experience with unfluffed ore in the refinery oil gas system has been with natural oxides (bog ores), although we have tried several of the well known manufactured or by-product oxides with a view toward obtaining information that would be valuable if this practice is finally adopted for the mixed gas purification system. A study was made of the relative effect of wide swings in moisture content of the bog ores vs. the manufactured or by-product oxides. It was found that the bog ores, by virtue of their more granular structure, reacted much more favorably under varying moisture conditions, in that they permitted drainage of excessive moisture. On the other hand, the fine state of division of the iron oxide particles of the manufactured or by-product oxides, coupled with their greatly reduced organic and inert material content, prevented the drainage of the excess moisture and excessively high back pressures soon resulted. We also found that the presence of this excessive moisture greatly reduced the purification efficiency, although we were sure that we were obtaining uniform distribution of the gas. Apparently the efficiency of the iron oxides, when excessively wet, is reduced by the slower rate of transfer through the water surrounding it. The efficiency of the oxides, when observed in this condition, was improved by spraying the material with an alkaline solution to correct for acidity. In addition to correcting for acidity, we believe that the alkaline solution facilitates the transfer of the hydrogen sulphide to the iron particles.



Converted 3 Layer—5500 Bushel, Mixed Oxide Purifier Box Providing for 6 Layers of Unfluffed Ore. Note Adopted Safe Practice of Using Salt Glazed Tile Pipe to Replace Wooden Dump Hole Posts.

While the fluctuations in moisture in the mixed gas system are not as great as those encountered in the re-

finery oil gas system, we have been able to observe this effect to a minor degree in the several batches of unfluffed manufactured iron oxides now in service in the "catch box" position in our mixed gas system. After six months' service, during which time we have purposely overloaded these series in order to place a load on the last box, we are able to report very favorable performance. The back pressure set up by the raw ore, while not excessive as yet, nevertheless requires additional power from the works exhauster and, at the same time, limits the plant throughout. We believe that an active oxide of larger particle size will fill this need and as this report is being written we are conducting laboratory tests on samples of a well known manufactured oxide, which has been submitted to us in various particle sizes for test purposes. The samples include material graded in sizes ranging from about 5/8" (over 4 mesh wire screen) down to that which passes through 40 mesh and is retained on 60 mesh.

We believe that the material running between 1/8" and 1/4" in diameter is the one which will work out to the best advantage in our system. Thus far the laboratory fouling and revivifying tests indicate complete penetration of the particles by the H_2S in the fouling cycle and practically 100% revivification is obtained.

We estimate that through the use of unfluffed ore, over-all purification labor costs may be materially reduced. Aside from the actual operating savings, we believe that there are many other important advantages to be realized which should be of interest to the entire gas industry and we expect to continue our work until that end is attained.

Laboratory Cracking Furnace for Heavy Oils and Gas Oils

By I. B. Dick

Consolidated Gas Company of New York

OUR first step was to set up and operate a furnace as nearly identical to Griffith's* as possible. From the experience so obtained, changes were made to facilitate use of the apparatus on heavy oils.

Figure 1 is a sketch of the apparatus in its present form. Hydrogen from a cylinder (A) passes through a regulator (B) and saturator (C) to the holder (D), and thence through flow meter (E), and hydrogen-water meter (F) into the furnace (G). Oil is displaced into the furnace from oil reservoir (I) by water delivered at a constant rate by pump (H). In the furnace, the oil drops upon fragments of broken silica supported in a basket of nichrome gauze, where the oil vaporizes. Oil vapors are carried through the hot zone of the furnace by the hydrogen and "cracked." The enriched hydrogen is cooled and freed of tar and hydrogen sulphide in purifier (K), metered (L), and stored in holder (M), pending determination of heating value by a Thomas calorimeter. The temperature of cracking is measured at the center of the cracking tube by a thermocouple protected by a silica sheath.

Hydrogen has been retained as the cracking atmosphere for reasons of convenience and of accuracy. Bottled hydrogen is more readily available than blue gas, and its constant heating value makes calorimetric determinations of the inlet gas unnecessary. Hydrogen has a further advantage in its stability at cracking temperatures. Reactions among constituents of blue gas occur at these temperatures, resulting in change in volume and heating value of the blue gas, which introduces variable errors into the calculation of gas enrichment value of oils tested.

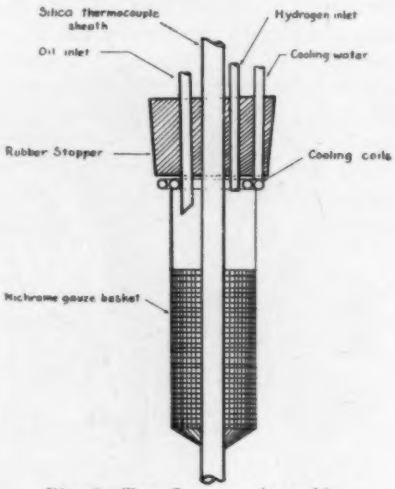


Fig. 2—Top Stopper Assembly.

Our present apparatus embodies numerous changes from the original Griffith apparatus. In construction of the electric furnace, the resistance element was originally wound by hand directly on the silica reaction tube. A break in the tube required rewinding the furnace, and, further, the heating coils tended to sag when hot, causing short circuits. Units especially designed for this service, with replaceable heating elements wound separately on alundum tubes, have been furnished by the Hoskins Manufacturing Company, and have proved entirely satisfactory. Several have been in use about 4000 hours and are still operating with the orginal heating elements.

The top and bottom of the silica

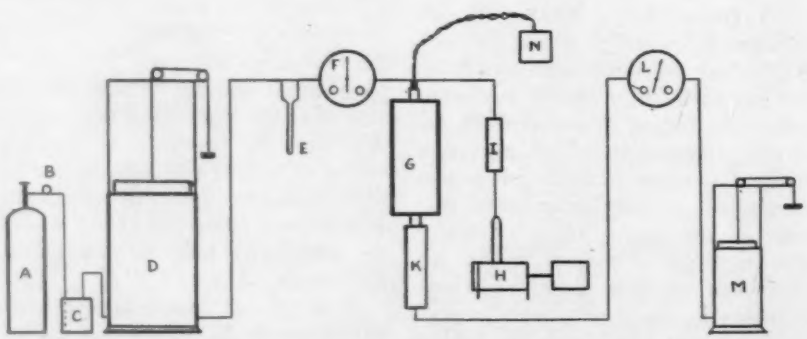


Fig. 1—Present Apparatus Developed from Griffith's.

**R. H. Griffith, "The Valuation and Cracking of Gas Oils," J. Soc. Chem. Ind., Vol. 48, August 23, 1929, page 252-T.*

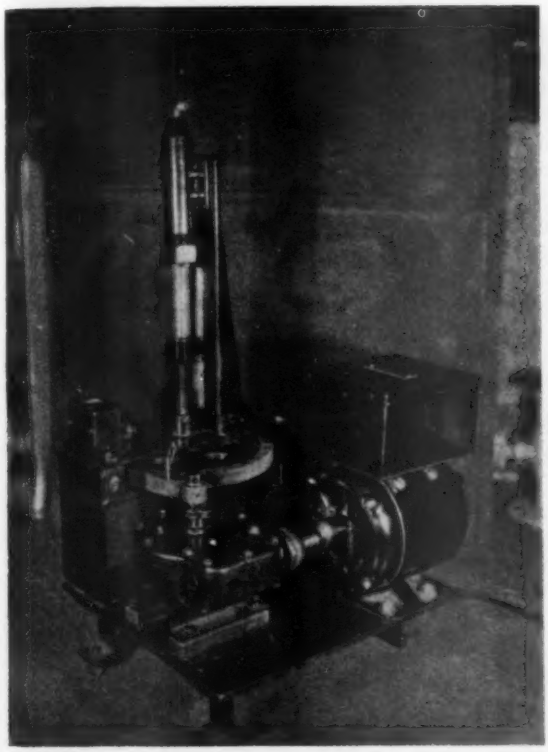


Fig. 3—Pump for Oil Feed Regulation.

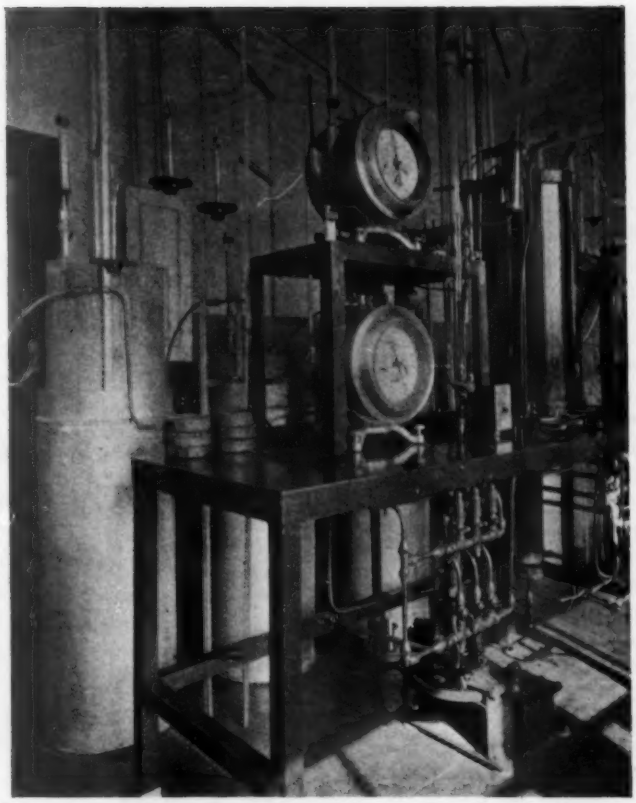


Fig. 4—Installation of Cracking Furnace.

tube are closed by rubber stoppers protected from the heat by cooling coils, as in the original unit, but the assemblies are different. Figure 2 shows present arrangement of the top stopper. The oil inlet line has been changed from glass to copper tubing, to permit delivery of oil at the desired spot inside the furnace. Fragments of broken silica tubing have replaced iron balls in the nichrome basket to avoid oxidation of the iron during scurfing of the unit, followed by reduction with accompanying consumption of hydrogen at the start of the next test. This basket hangs in a temperature zone of the furnace that permits the oil delivered into it to vaporize, leaving a deposit of dry carbon on the silica.

The bottom stopper now fits outside the silica tube and accommodates the purifying tube, which is now a single piece of copper tubing 15" long by 3" diameter, containing new iron oxide sponge with a plug of cotton at each end.

Hydrogen entering the furnace is metered by a laboratory wet test meter, but the rate of flow is indicated on a flow meter and is maintained by adjustment of a needle valve. Constant pressure is maintained on the hydrogen system by floating a 5 cubic foot gasometer on the line. The height of the gasometer bell is maintained automatically by a cock on the hydrogen inlet line which opens as the bell drops and closes as it rises. Hydrogen is saturated with water vapor in a bubbling bottle before metering to prevent evaporation of water from the meter.

An electrically operated pump has been developed for delivering oil to the cracking furnace. The pump is entirely automatic in operation, and will deliver oil at a constant rate that can be set within the range of about 30 to 60 cubic centimeters an hour. Figure 3 is a photograph of one of these pumps. Power from the motor is transmitted through a 100-1 speed reducer to an eccentric which actuates a pawl. The pawl turns a ratchet gear which rotates a threaded shaft in a threaded collar inside the piston. The piston is guided so it cannot rotate, but must move up or down by short, frequent steps. Control of the rate is effected by adjustment of the length of stroke of the pawl. The pump actually pumps water, which in turn displaces oil from the oil reservoir; this to save the labor of cleaning oil from the pump after each test. The volume of oil delivered during a test is determined from the number of rotations of the ratchet gear as measured by a revolution counter and by a scale marked on the ratchet gear, and is checked by running the pump back to its starting position and replacing the water used by water from a burette connected to the discharge line by a 3-way cock.

The oil gas-hydrogen mixture from the furnace is metered and collected in a 2 cubic foot holder constructed for this service. At the conclusion of a test, a holder is nearly full. The heating value of the gas is then determined on a Thomas calorimeter. Three finished gas holders are provided for each unit to expedite the work. The Thomas calorimeter has been used instead of the flow calorimeter on account of convenience of operation and the smaller volume of gas required for a determination.

Figure 4 shows one unit ready for operation. All parts of the equipment are available to the operator from the front of the table, which affords ease and speed of manipulation. Our laboratory installation consists of five such units.

To make a test, the temperature of the furnace is brought to the de-

sired point, as indicated by the pyrometer, by adjusting the rheostat. The purifier is filled with fresh oxide sponge and connected to the bottom of the furnace. About 150 cc. of oil are placed over water in the oil reservoir and the reservoir assembled. Oil is forced up into the inlet tube to the furnace by adding water to the reservoir through the burette. The apparatus is now purged with carbon dixoide, after which hydrogen is admitted and the flow adjusted to 3 cubic feet per hour as indicated by the flow meter. The oil pump is adjusted and operated to deliver oil at a rate set to produce a finished gas of about the heating value of the gas we deliver to our consumers. About 15 minutes is allowed for conditions to reach equilibrium. The test is then started by reading simultaneously the inlet and outlet gas meters and the position of the ratchet gear on the oil pump. The gas make is collected in a 2 cubic foot holder. Temperature and pressure at the meters, temperature of the oil and barometric pressure and atmospheric temperature are noted. The oil rate, hydrogen rate and furnace temperature are then maintained constant for thirty minutes. The test is then brought to an end by simultaneously stopping the hydrogen flow and the oil pump. The same readings are taken as at the beginning of the test, and the volume of oil delivered is determined as previously explained. Heating value of the gas is then determined on the Thomas calorimeter. After the last test on a given day, the apparatus is purged with carbon dioxide and the furnace is cleared of carbon by allowing air to circulate through it overnight.

The volume of hydrogen and finished gas are corrected for temperature and pressure, and the volume of oil used is corrected for temperature. The B.t.u. per cubic foot of oil gas and the cubic feet of oil gas per gallon of oil are readily calculated. B.t.u. per gallon is the product of these two.

With one apparatus, starting with a hot furnace, an operator can test an oil at one temperature and calculate the results within an hour and a half. No difficulty is experienced in testing one oil at six temperatures in seven hours, or in testing four oils at the same temperature in that time. An experienced and capable man can operate two units simultaneously. We have no difficulty in reproducing results within 2 M. B.t.u. per gallon by different operators on different units. A four ounce oil sample is adequate for cracking tests of an oil at three temperatures.

The parts of the apparatus, exclusive of the Thomas calorimeter, cost about $700. A flow calorimeter can be substituted for the Thomas, but larger quantities of gas are required for the calorimetric determination, necessitating longer duration of tests.

Some Comparisons of 800 B.t.u. Water Gas with 530 B.t.u. Gas

By K. B. Nagler

The Peoples Gas Light & Coke Co., Chicago.

ESSENTIALLY high B.t.u. water gas is made by greatly increasing the oil gas portion and decreasing the blue gas portion of the carburetted water gas. The first end is obtained by high oil input—approximately 7.5 gallons vs. 3.0 gallons for 530B.t.u. gas. Obviously, the decrease in blue gas is obtained by decrease in steam input—15 to 20 pounds per MCF vs. 30 pounds for 530 B.t.u. gas. The fuel consumption is substantially as before, approximately 30 pounds coke per MCF. The heats carried at the base of the superheater are about 1350-1400°F.

Of the total oil input of say 7.5 gallons per MCF, about 4¾ gallons are introduced as usual in the carburetter and 2¾ gallons above the generator fire during the uprun. The specific gravity of such 800 B.t.u. gas is about 0.69. To obtain gas of lower specific gravity requires some reforming of oil through the generator fire on the down-run.

The tar yield is greatly increased —approximately 1.1 gallons per MCF vs. about 0.2 gallons per MCF of 530 B.t.u. gas. Evidently the so-called oil efficiency is considerably reduced, 85,000 to 90,000 B.t.u. contributed per gallon of oil, as compared with approximately 100,000 B.t.u. per gallon when using only about 3 gallons per MCF.

The thermal capacity of a gas machine is increased when making 800 B.t.u. gas. The thermal capacity increase ranges from about 15% to 20% for large machines to 50% and more for small machines.

The attached table gives essential production data and analyses for standard 540 B.t.u. gas, a 23.5 candle power gas of 1910, and typical 800 B.t.u. gas.

Comparisons of Water Gas 540 to 800 B.t.u.

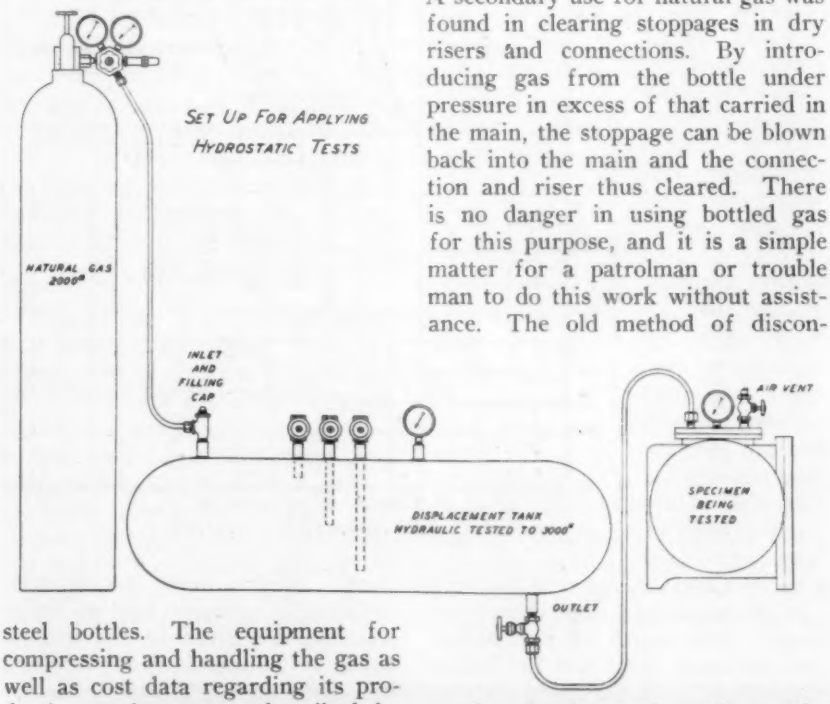
B.t.u.	540	695*	811	826	850
Gals. Oil/ MCF. ..	3.0	4.23	7.48	6.34	8.58
Lbs. Fuel/ MCF. ..	30.0	30.82	32.12	28.83	31.95
Lbs. Steam/ MCF. ..	30.0	30.90	20.02	25.10	19.80
CO_2	3.4	4.3	1.8	2.7	1.6
Ill	8.4	12.6	19.7	19.1	18.9
O_2	1.2	0.7	0.3	0.3	0.2
CO	30.0	30.2	25.7	22.3	21.3
H_2	31.7	29.3	29.2	27.6	28.0
CH_4	12.2	17.8	13.5	19.7	20.7
C_2H_6	...	...	5.2	3.6	4.3
N_2	13.1	5.1	4.6	4.7	5.0
Sp. Gr....	0.64	...	0.70	0.69	0.69

*23.5 candle-power gas.

Technical Digest

NATURAL GAS FOR TESTING MAINS

Natural gas, compressed to 2000 pounds per square inch, is used for testing gas mains and services to economize over the excessive cost of sending an air compressor to do the job. The natural gas is used in steel bottles. The equipment for compressing and handling the gas as well as cost data regarding its production and use are described by F. H. Winslow in his paper, recently presented before the Spring Technical Conference of the Pacific Coast Gas Association. Cost of the compressed gas, including power, gas, labor, etc., averages $0.00387 per cubic foot. A needle valve is required to regulate the flow of gas from the cylinders. Cost data on the use of the compressed natural gas show that it is cheaper than other methods of testing the mains. A secondary use for natural gas was found in clearing stoppages in dry risers and connections. By introducing gas from the bottle under pressure in excess of that carried in the main, the stoppage can be blown back into the main and the connection and riser thus cleared. There is no danger in using bottled gas for this purpose, and it is a simple matter for a patrolman or trouble man to do this work without assistance. The old method of disconnecting the riser and running a wire through a cock into the main is quite dangerous and expensive under high pressure. The accompanying illustration shows a set up for making hydrostatic tests.



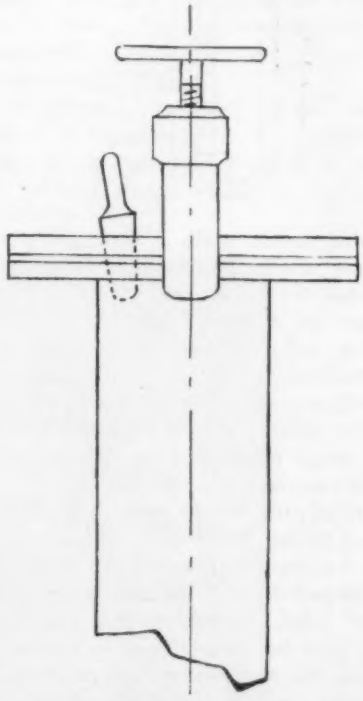
GASIFICATION OF COAL IN SMALL WORKS

A study has been made of the substitution of small horizontal or vertical chamber ovens for horizontal retorts in medium-sized and small gas works. This practice results in greater flexibility, a large increase in thermal yield per ton of coal and reduced labor costs. More coke for sale is made owing to the need of less producer fuel. Three settings of horizontal and one of vertical ovens and the results obtained from one of them are described. By fitting a sensitive exhauster-house governor, the pressure on the retorts and the density and calorific value of the gas can be kept constant over long periods. A novel method of carbonization is described in which there are two adjacent vertical chambers. The smaller one is filled with coke and after two hours' heating the larger is charged with coal. The coke is steamed and the water gas produced mixes with the coal gas in the space above the two ovens, where cracking of the tar takes place. The coal chamber is steamed for two hours before discharging and the coke chamber is filled with coke from time to time, to keep a fuel bed of even depth. The yield is 58 cubic meters of gas of calorific value 4450 kilogram-calories per 100 kilograms of coal, as compared with the average of 46 cubic meters by other methods.

—Anonymous. Das Gas un Wasserfach, volume 76, 1933, pages 21 to 25 and 44 to 49.

AVOIDING LOSS OF GAS IN RETORT JOINTING

Gas and time are lost in making retort joints of the type in which clay is used as the cementing material. The clay is applied after the old joint has been scraped and this takes time, while pressure is raised within the retort to avoid the entrance of air. The clay joint is replaced by one of asbestos. Better results have been obtained by using asbestos rope, and a dry joint can be instantaneously made with such rope. In order to avoid loosening the head of the retort, a conical hole is bored through it and this is plugged with a bung as shown in the accompanying illustration. Thus when a retort "smokes," a fire rod is passed through the hole, about 30 to 35 millimeters in diameter, and worked around in the retort. This

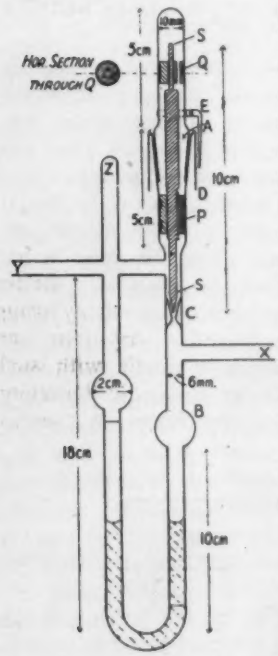


allows completion of the distillation without raking the charge too often.

—Anonymous. Le Gaz et l'Electricite, volume 69, 1933, pages 183-4.

WIDE RANGE VARIABLE GAS FLOWMETER

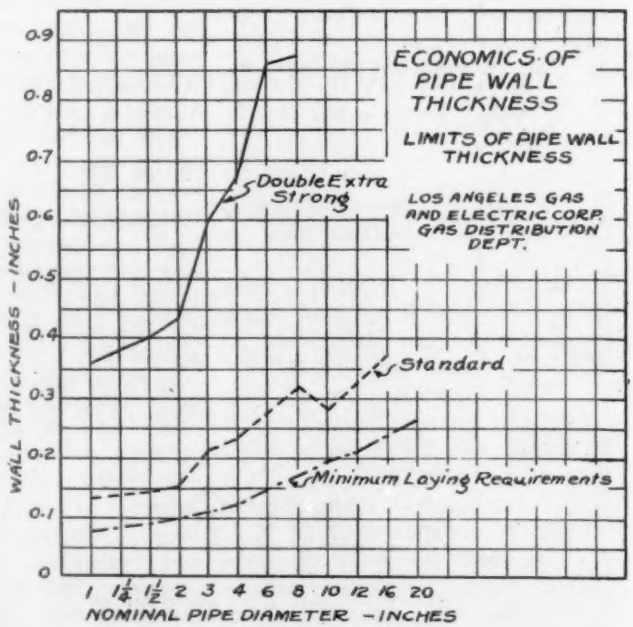
A flowmeter capable of measuring rates of gas flow with uniform accuracy over a wide range is shown in the illustration. The working range is from 100 cc. to 10 liters per minute and can be extended when necessary at both the upper and lower limits. With the exception of the metal spindles S S and the sleeves P and Q, glass is used throughout, the rotation of the spindle requisite for variation of the choke aperture being provided by the ground joint A. The choke tube works with a constant pressure difference between the two sides of the orifice. The gas enters at X and leaves at Y. The side tube Z is merely for convenience in filling the manometer and is sealed off when not in use. The scale of flow rates is marked on a brass cylinder D which is spun over at one end and attached to the rim of the female ground joint section by cement or wax. The pointer E, constructed of stiff strip, is clamped to the rotating section of the joint. Provided that attention is paid to the elimination of backlash, the calibration of the meter remains constant. Where greater sensitiveness and robustness are required, as in a meter intended for use as a laboratory sub-standard, metal may be used throughout with the exception of the manometer, rotation being allowed by a lapped or tapered ground joint. The scale of flow rates is linear from 100 cc. to 8 liters per minute, and a stream of gas passing through the meter can be kept at constant rate to within one per cent. Details are given of the construction of the apparatus in the original article.



—B. W. Bradford. Chemistry and Industry, 1933 pages 363 to 364.

PIPE WALL THICKNESS ECONOMICS

Best economy in the distribution system will be obtained by making all pipes in the system, regardless of size or soil conditions, last more nearly the same number of years. This plan is based on the assumption that increasing the lives of underground structures beyond certain limits is not always desirable and is seldom economical. The longer the pipe remains underground the greater the possibility of its having to be removed because of obsolescence and not because of physical depreciation. Cost of extending lives of underground pipes to a great age exceeds the limits of sound economics in all except rare cases. True worth of any protective covering must not be judged solely by the number of years it increases the life of the pipe, but must be judged as well by the manner in which it affects the annual fixed charges. Equations are worked out for comparing the economy of laying unprotected pipe with that of protected pipe. If all the pipes in the distribution system are to last approximately the same length of time regardless of size and soil environment, the kind of protective coating must not only be varied with the corrosiveness of the soil but the thickness of the pipe wall must be varied in accordance with the effectiveness of the protective coating. Extra-heavy pipe protected with finest kind of coating obtainable must be laid in very severe soils. Light-weight pipe without any covering at all can be laid in mild soils. If this system is adopted, it will do away with the present practice of tying small service pipes having relatively thin walls into mains having relatively heavy walls. The range over which it is safe to vary pipe wall thickness is shown graphically in the accompanying curve sheet. Further details of this plan, including a problem worked out to solution, are given in the original paper by Normal L. Hoff, delivered before the Spring Technical Conference of the Pacific Coast Gas Association.



LOW DENSITY CARBURETED WATER GAS

Carbureted water gas of low enough density to be easily and effectively mixed with coal gas or coke oven gas is made by periodically air-blasting the fuel bed with an upward current of air and admitting secondary air to the upper portion of the generator so as to consume the producer gas generated by the primary blast. The blast gases are led through the carburetor and superheater and their combustion is completed there with additional secondary air if necessary. The desired quantity of heat may be stored in the top of the fuel bed, the carbure-

(Continued on page 38)

MOBILE SALES OFFENSIVE

Peoples Natural Gas Company carries the story of gas and the carefree kitchen out into the highways and byways with all the effectiveness-but with infinitely more style-of the peddler of old

ALERT to the fact that changing general conditions are affecting consumers' buying habits, The Peoples Natural Gas Company of Pittsburgh has added mobility to its sales offensive through the medium of a traveling display car which will effectively demonstrate the advantages of gas and gas appliances, literally on the consumer's own doorstep.

The new car is an innovation in merchandising methods. The express aim is not to sell merely appliances, but to sell and resell both old and new customers on the superiority and advantages of natural gas.

The display car, itself, is a gleaming white coach, twenty-two and one-half feet long, eight feet high and eight feet wide, which is equipped with a variety of gas appliances. Motive power is supplied by a Lincoln coupe which is also finished in white. Together they form, not an automobile and trailer, but a single, six-wheeled vehicle which travels at ordinary road speeds and is easily maneuverable.

The outfit made its first public appearance on May 26, at the Hotel Schenley, Pittsburgh, where a luncheon and official showing was sponsored by The Congress of Clubs and Club Women of Western Pennsylvania, an organization which has a membership of hundreds of women's clubs and over 22,000 individuals over a wide area surrounding Pittsburgh.

The display car is divided into two compartments. The rear section is fitted out as a modern kitchen. The equipment includes an air-cooled Electrolux, a full-automatic Estate Range, a Monel-metal sink, and a work table which also is topped with Monel-metal. Plentiful storage space is provided by drawers in the stove and by lockers below and above the sink and work table. In a large locker at the rear of the kitchen are stored two large gas cylinders which provide the fuel which keeps the gas equipment in operation, while directly opposite is another locker of the same size which houses generating equipment for operation of the lights and ventilators. The two gas cylinders hold 100 pounds each of liquid propane. Each pound of liquid will produce 8.59 cubic feet of gas at atmospheric pressure. Each cubic foot of gas contains 2503 B.t.u.

The front compartment of the car carries a Kompak water heater, which is connected with the sink in the kitchen compartment, an incin-

The Traveling Display Kitchen of the Peoples Natural Gas Company ready for the road. The coach is 22 feet long, approximately 8 feet wide, and will accommodat e 6 visitors comfortably in addition to the demonstrator. A Lincoln coupe provides mobility.

erator and a gas press-ironer. A comfortable davenport extends across the front end of this compartment. All decorations of the interior are carried out in green and white.

Despite the large amount of equipment in the car, space has been utilized with such economy that there is plenty of room for visitors. Half a dozen persons, in addition to the demonstrator, can pe accommodated at one time. Head-room of more than six feet permits even a tall man to stand in the car comfortably. Entrance to the car is gained through a side door in the front compartment, and a door at the rear serves as an exit.

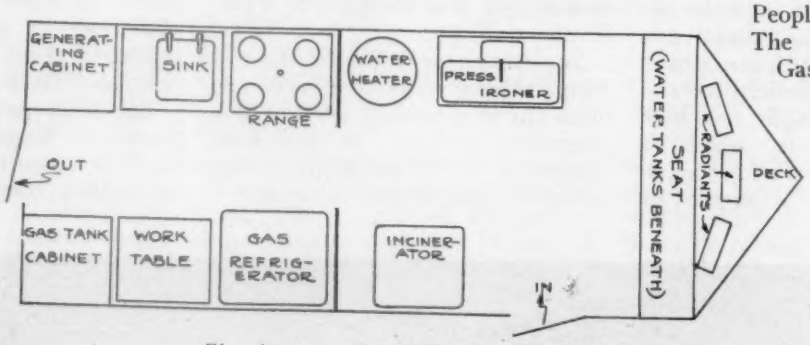
Two loud speakers, carried outside on the front of the display car, broadcast music from a phonograph. Microphones permit the announcements of messages from either the coupe or coach. The outfit has the appearance of a veritable land yacht. Its size and spotless white paint give it maximum attention value, yet there is nothing reminiscent of the circus in its appearance.

Two interested visitors to the traveling display coach of the Peoples Natural Gas Company look on while Miss Pearl Gray, Home Service Director, prepares some toothsome dainty.

A picture of a gas derrick is painted on the coach, and the outfit is identified by large brass plates bearing the name of The Peoples Natural Gas Company.

Miss Pearl Gray, director of the home service department of The Peoples Company, will travel with the car to handle all demonstration and school activities. Miss Gray is widely known in this field and has had several years experience in educational domestic economy work as well as in home service department enterprsies. The car will be driven by Mr. C. Ted Robinson, a salesman of The Peoples Company.

The coach will cover the territory served by The Peoples Company and by The Columbia Natural Gas Company.



Plan (not to scale) of Traveling Display Car

Low Density Carburetted Water Gas

(Continued from page 36)

tor and superheater for the vaporization of the increased quantity of oil and the fixing of the oil gas. Furthermore, this heat is stored in a manner making available an increased area of hot surface for oil vaporization and fixing. At the same time the blasting operation may be carried out without producing in the fuel bed temperatures which are excessive in the partial decomposition of the oil gas passed through it. Up and down water gas runs are made between air blasting operations. During the up run the resulting water gas is carburetted by vaporizing oil and fixing the oil gas by a portion of the stored heat of the blast gas to produce carburetted water gas of ordinary specific gravity. During the down run another portion of the stored heat is utilized to vaporize oil and produce oil gas which is passed through the fuel bed with the steam and is partially decomposed, liberating carbon and hydrogen and producing a gas, composed of hydrogen and hydrocarbons, which carburets the water gas simultaneously produced by the reaction of the steam with the fuel and with liberated carbon. The gas thus obtained is of low specific gravity and when mixed with the up run carburetted water gas gives a final product which may have a thermal value of 530 B.t.u. and a specific gravity of 0.54.

—British Patent No. 373,486; Humphreys & Glasgow, Ltd.

Effective Advertising Appeals

Analyzed by the Copywriter

STYLE

FOR the past few years Americans have been "style hungry." Under the stress of economic necessity, only articles of extreme utility were brought into the average home. Frills and furbelows were regretfully eliminated where they required a few extra dollars of expenditure. Hence the demand for lower and ever lower prices for gas appliances. Those actually purchased were stripped of all but the barest essentials. Oft-times even quality was sacrificed.

Such a condition could not last indefinitely. There are signs today that it has reached the end. Certainly, the slightest lifting of the pressure that all of us have been struggling under should result almost immediately in a renewed insistence on all of those things which represent the higher standards of living and the free exercise of cultivated taste. This tendency toward constant renewal and betterment is instinctive in this country. It has only been dulled temporarily by the depression.

What has this to do with advertising? A great deal. Style . . . fashion . . . "keeping up with the Joneses" it used to be called . . . has always been one of the most powerful buying incentives—in normal times, at any rate. During the depression we have seen the contrary tendency on an enormous scale. It has actually been the fashionable thing to pretend you were poorer than you really were. Display of any kind seemed to appear in bad taste. No wonder buying power declined and assets were hoarded. It was the creation of a national psychology against which we were helpless until it began to run its course.

Now that the industrial and commercial machine has been thrown out of reverse, as we all hope and believe, there is a big job ahead for the advertising man to guide the renewed desires of the public into the proper channels. In the case of the gas industry, that means the sucessful promotion of all the new and improved equipment that has been developed by our appliance manufacturers throughout this entire period of national sackcloth and ashes. Wonderful progress has been made, not only in technical efficiency and mechanical convenience, but even more, perhaps, in the functional design of all types of gas-using appliances. These are the things that must be capitalized and promoted into the new style age that is slowly but surely creating the markets of the immediate tomorrow.

Some effective advertising of this sort has been done by gas companies already. In refrigeration, for example, "It's Not Smart These Days" to serve wilted vegetables, melted butter, and milk that is not absolutely sweet. "RIGHT IN STYLE" —"It's Fashionable to Be Far-Sighted" when you choose your automatic refrigerator. That's why gas refrigerators have gone into hundreds of thousands of up-to-date homes. "It Has Already Captured the Most Sophisticated Market in the World."

Since the wheel has come around full circle, it is quite in order once again to emphasize the *smartness* of any product that can bid for favor on that platform. Especially since some of the new appliances can truthfully be said to be "As Carefully Styled as the Latest Paris Gown." The fact is that during the past few years many things have reached a state of obsolescence which their owners fondly believe to be thoroughly modern, or at least which, they believe, have not been materially improved. The gas range has been a striking illustration. An advertisement stating "Your Ten-Year-Old Gas Range Is 20 Years Old Today" is conservative, if anything, when we compare it with a standard appliance of 1933 with its insulated oven, automatic heat con-

MAKE YOUR KITCHEN
• • • YOUNG AGAIN!
Annual January
GAS RANGE
Replacement Sale
PLAN NOW—this month—to make your kitchen young again . . . up-to-the-minute . . . modern. It's easy during January in our great annual sale. Low prices, a generous allowance for your old range, small down payment (as little as $4 on many models) and a whole year to pay the balance.
No more guessing and anxious watching in your kitchen—for now everything is done to a delicious turn by automatic devices. These new gas ranges are beautiful, too—gay and smart, with such leisure-creating features as automatic time and heat controls, self-lighting burners, roomy ovens, utensil drawers, smooth table-tops.
Remember . . . low prices—generous allowance on your old range (no matter what kind or condition)—small down payment—12 months to pay. Attend this famous sale today and begin at once to brighten the daily menus of 1933 with tempting new dishes cooked in the modern manner.
BOSTON • CONSOLIDATED • GAS • COMPANY

Pointing the Way to Rejuvenated Kitchens

trol, smokeless broiler, automatic time control; not to mention, of course, its radically improved appearance.

Ten years ago, gas companies advertised with such headlines as "Kitchen Slaves Are Out of Style"; or "Is Her Kitchen as Up-to-Date as Your Office?" That was just the beginning, the expression of a hope rather than a statement of fact. Today we have advanced so far that the woman who spends any considerable time in housework is conspicuous among her neighbors. She is unfashionable and her house itself is as out-of-date as a plate rail. It is one of the functions of advertising to get "parlor antiques" out of the kitchen. One of the best ways is to give some attention to the style of the kitchen itself.

Kitchen Planning

A great deal is being talked of these days about "kitchen planning." This means not only the best and most convenient arrangement of kitchen appliances. It also implies a modernized appearance of curtains, floor covering and cabinet work. The theory and it is a perfectly practical one—is that the outmoded gas range and ice box will stick out like a sore thumb in such an environment. Actually, it is a modern adaptation of the ensemble-buying school, only that, instead of trying to sell a complete bill of goods at once, you introduce a fundamental thought and let one development lead into another. This is the complete realization of the style appeal, for the fundamental basis of style is appropriateness and harmony down to the slightest detail.

The gas range, of course, is the logical starting point of the modernized kitchen, so, let us begin by advertising, "There's Inspiration in Every Line of a Modern Gas Range." "Good Taste and Good Design Meet in the New Gas Ranges."

Remember that one of the reasons for the public's new interest in the appearance of the kitchen as well as its efficiency is the fact that the kitchen is no longer the "hidden room" of the house. Your guests are just as apt to find their way into the culinary department as any other place—even more so, perhaps. For this reason the kitchen of today has such things as "appointments", and a variety of refinements that have attractiveness as their principal object. The kitchen has actually become one of the modern woman's "Subtle Ways of Announcing Her Social Position!" This is a thought that lends itself readily to advertising.

"Does Your Kitchen Look a Bit Worn and Shabby?" Many kitchens do, only their owners need to have the fact brought home to their attention. Certainly, "their best friends won't tell them." Appliance design today is "Accurately Reflecting the Best Feminine Taste in America," as one large national advertiser put it. At least, no woman need be ashamed of being chummy with the modern "kitchen stove." The Cinderella of today is in just as good society as her sisters at the court, providing the fairy godmother has supplied her with automatic gas equipment. It is no longer possible to laugh, as we formerly did, at an advertisement showing an attractive woman with high heels and chiffon dress cooking dinner for a family of four. Today, with the possible addition of a dainty apron, it is quite the proper style.

There is no reason why the tone of all gas advertising should not reflect the social trend in its various manifestations. In fact, there is no reason why women newspaper readers should not scan the advertisements of the gas company for fashion news about their kitchens and homes just as they do the advertisements of department stores for the latest in frocks and frills—for instance, "What the Well-Dressed Kitchens Are Wearing." Occasional pictures of the kitchens of prominent homes in your territory will go a long way in setting the pace for the rest of the community. Especially the kitchens of "newly-weds" will bring home to their elders that "Kitchen Styles Have Changed in the Last Decade." Most people, especially women, have a dread of being "dated." The kitchen is a "dead give-away" unless it is kept regularly up-to-date.

Therefore, "Make Your Kitchen Young Again" would make a suitable caption for an entire campaign; so would a series of advertisements on "Let's Get Rid of the Matchbox." Matches, by the way, are only one of many subtle indications of old-fashioned homemaking that can be introduced effectively into gas company advertising, not only on ranges, but water heating, and other applications as well. "The Draperies Tell You Gas Heat Is Clean" is fundamentally a fashion appeal. "The New Mode in Basement Decorations" is a valid attempt to capitalize on the vogue for informal entertainment.

Personal Appearance

Just as the type of gas equipment affect fashions in the home, so does it also affect the personal appearance of the homemaker both inside her home and away from it. Many advertisers have paid dividends on the "Poor Red Hands" appeal; but in no instance has it a more legitimate place than in the advertising of modern gas appliances. Certainly, "Gas Service Keeps Dainty Hands White." Wherever you go, "Dainty Hands Tell Their Own Story." "Will Your Child Keep That Schoolgirl Complexion?" It is doubtful, unless you keep plenty of hot water on tap.

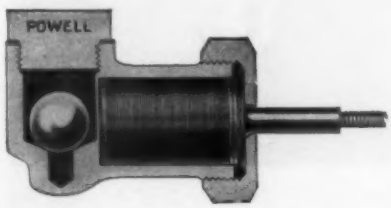
And so on. Psychologically, the fashion appeal is based on the very human feeling that the eyes of the world—specifically, our neighbors—are constantly upon us. "What Do the Neighbors Think of Her Children" when there's no automatic hot water supply to keep their clothes and faces bright and clean? What do they think of her home when it is inadequately supplied with modern necessities? What do they *think?* Smart advertising keeps us conscious of our deficiencies. Who shall say there is no social value in that?

EQUIPMENT NEWS

Solenoid Globe Valve

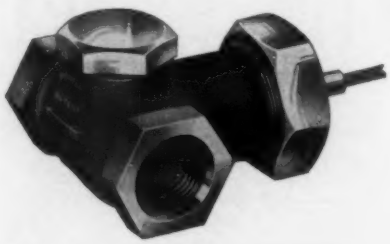
The William Powell Co., Cincinnati, O., announce a newly designed valve, electrically operated, for the remote control of gas, air, steam and water lines, and is called the Solenoid Globe Valve.

It is made with either a high grade steam bronze or a non-magnetic iron body on the side of which is a housing for sealing in a solenoid or magnet. The magnet, when energized, pulls the ball from the valve seat horizontally and holds



it against a metal divisional wall between the magnet and the valve body. When the current is turned off the ball gently rolls back on the seat, thus closing the valve tightly.

The valve will function, without injury to the solenoid, on control lines buried underground or submerged in water. All electrical parts are sealed within the valve and are water-proof. Because there are



no exposed electrical arcing or sparking contacts the valve can be used near explosive liquids or gases. Neither the valve nor the electrical parts require adjustments. On pilot burners the valve can be provided with a thermostat which automatically closes the valve should the pilot flame be extinguished.

The valve has a variety of applications as on automatic gas water heater equipment and fuel control lines to gas burning equipment. Illustrated bulletin will be mailed on request.

New Automatic Safety Gas Pilot Control

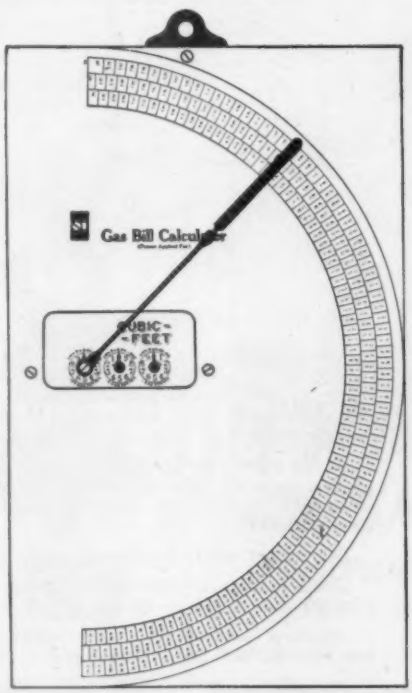
The Watrola Corporation, Ltd., San Francisco, Calif., have developed a new automatic safety device for gas pilot control. It is a mono-metal alloy device, or robot, which, as contrasted with a bi-metal thermostat, has the characteristics of a movement of 30-thousandths; with a complete cycle in seconds; with practically unvarying speed under widely varying temperatures; with a pulling power of 30 to 50 lbs. and upward; with a fatigue point beyond the temperature of ordinary fireboxes, and it is not a thermostat. It forms the activating control member in conjunction with a new carbureting pilot light burner of unusual economy and having the inherent ability of purging itself of gas gum.

The new device, together with other safety equipment, will be marketed under the name "PowerStat" by a corporation already formed bearing the same name.

Heading the new corporation is Arthur F. Erickson, who was head of a company bearing his own name, which manufactured and distributed control equipment on a national basis. Associated with Erickson in the development of the PowerStat line is Allen W. Widenham, who originally was with the gas utility industry, later a sales executive, and of late has been identified with a comprehensive gas appliance research and development program, of which the foregoing items are a part.

Gas Bill Calculator

The Reliable Meter Co., Houston, Tex., announce the "Gas Bill Calculator." The device is hand operated, being made up



with a train of gears, the same as in a gas meter index with a knob attached at the rear to the 1,000 foot hand. The charts are calculated and printed to correspond with the prevailing rates in the various communities. Therefore by turning knob in rear the large hand advances and indicates on the chart the amount, in dollars and cents, according to the number of cubic feet registered.

A consumer using a Gas Bill Calculator need not be familiar with the technicalities of reading his gas meter and computing a bill, but by merely advancing the hands on his Calculator to the same position as the hands on his meter the figure exposed at the left of the large hand is the amount of the bill. To start a new month all that is necessary is to turn the large hand back. The Gas Bill Calculator is 13¾" x 8½", which size makes all figures easy to read.

Winch Truck with Sliding Roof

The American Coach & Body Co., Cleveland, O., announce a new type of winch truck (patent applied for) for public utility, industrial and other uses. The roof may be slid forward so as to com-

pletely expose the interior and thus permit direct loading of the truck by means of cranes or monorail systems. At the same time, full protection is given to the truck contents during transit. The type of truck shown is intended for public utility work and is provided with shelves for tools, ladder-racks, and a powerful winch driven from a special take-off shaft operated by the truck motor.

New Line of Dry Pointer Draft Cages

The Hays Corporation, Michigan City, Mich., announce the new Hays portable style draft gage of interest to heating engineers and installers of gas burners, furnaces and boilers. It uses no liquids and can be set up for service in 30 seconds. It does not require leveling. It can be placed on any convenient surface, pointer set to zero and readings taken. The standard ranges are either one-half inch or one inch water. Differential types can be supplied for indicating resistance, gas or air flow. A copy of booklet "Use of Draft Gage" will be mailed on request.

Brown Compensated Air Cell

The Brown Instrument Company, Philadelphia, Penna., has developed a new type of battery for use with the Brown Potentiometer, which eliminates frequent standardizing. This new battery, the Brown Compensated Air Cell, having a constant current output and a life of over 2½ years assures the potentiometer user of continuous accuracy with minimum attention. It can be used with all types of Brown Potentiometers. A bulletin describing the Brown Air Cell can be obtained from the manufacturer.

New Refrigeration Equipment

Among the many indoor weather manufacturing products announced by American Radiator & Standard Sanitary Corporation is a new steam vacuum refrigeration development. This will be known as a Decalorator and will be used to produce cold water for cooling. It is so designed that it can be manufactured in sizes for homes or the largest of buildings.

The Decalorator has no moving parts to get out of order, uses only water as a refrigerant, and will chill water as low as 35 degrees Fahrenheit.

Chilled water is produced by the practical application of a well-known physical law. Water under high vacuum will vaporize at low temperatures. To produce evaporation the sensible heat of the liquid is given up in the form of latent heat in the vapor. Chilling of the liquid is consequent to this conversion of heat.

Only the simplest kind of low and medium pressure piping is required. Steam at any pressure may be used, and it is not necessary to consider live loads in foundation design when installing a Decalorator.

An American Gas Products Corporation Ideal gas boiler is used to produce the steam for summer cooling as well as the hot water needed for winter heating.

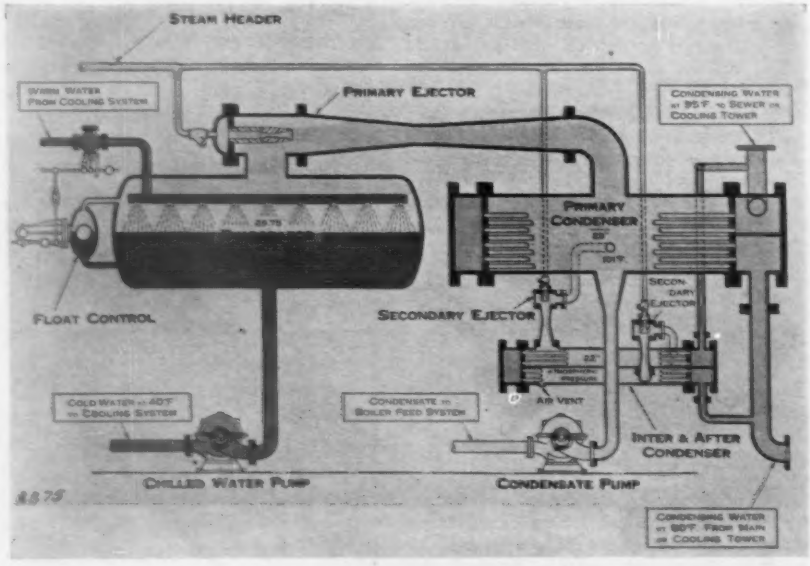
The gas boiler and the steam refrigeration unit are part of a plant which also purifies the air, humidifies in winter, dehumidifies in summer and circulates the air the year around.

The large size Decalorator units for office buildings and industrial plants are horizontal, whereas home size units are built in vertical type and occupy no more space than other means of mechanical refrigeration.

In addition to air conditioning, the Decalorator will economically and efficiently serve many cooling purposes, it is said. It is claimed to be ideal for cooling drinking water and other liquids and process work.

This equipment was perfected by engineers of American Blower Corporation, Detroit, Mich., subsidiary, but promotion and sale of it as a gas fired conditioner will be handled by the American Gas Products Corporation, it was announced.

E. B. Jeffries, Engineer, shows two fair and early visitors at the Century of Progress in Chicago, the new American Gas Products Corporation gas boiler that cools as well as heats. The product on the right is the new Decalorator that cools with steam from the gas fired boiler (left). The "dial of the seasons" is symbolic of the results obtained with these two products which have no moving parts. They are used in connection with an ACP "Sirocco" Conditioner.



FLOW DIAGRAM SHOWING OPERATION OF HORIZONTAL DECALORATOR

A vacuum of 29.75" mercury is maintained in the evaporator chamber. The water to be cooled is introduced into the evaporator in the form of a fine spray. Thus, sufficient water surface is present to cause an almost instantaneous evaporation, or "flashing," of a small quantity of water.

In this particular example (where 40° F. water is required) only about 1 per cent of the water is "flashed" into vapor, absorbing its heat of vaporization from the remaining 99 per cent, thereby chilling the main body of water to the required temperature.

The chilled water is pumped from the evaporator to the cooling system.

Steam introduced through the steam jet and traveling at high velocity through a Venturi tube produces the vacuum in the evaporator.

Standard methods of steam condensation are employed to reconvert this steam and the "flashed" vapor into liquid.

Operation is entirely automatic. A float control maintains a constant level of chilled water in the evaporator. A thermostatic control valve shuts off the steam to the ejectors when the chilled water temperature goes below any desired temperature. In the case of a varying load the thermostatic control turns the unit on and off, thus reducing steam consumption.

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

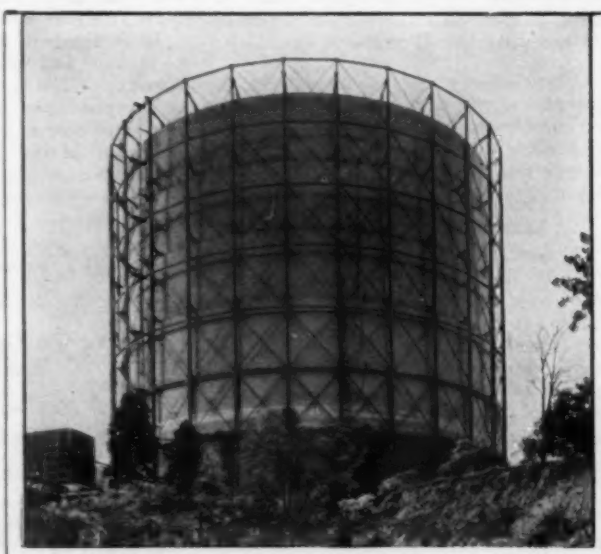
SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

Where Gas Needs to Be
"FOGGED"

WHERE natural gas is introduced into systems designed for manufactured gas, dust troubles may arise. Oil fogging is the remedy—adding to the gas a certain proportion of oil in vaporized form. The devices for doing this must vary, according to operating pressures and other conditions. In any case, however, some type of diaphragm valve is called for. Chaplin-Fulton valves, of both the differential and the throttling types, are available for all such uses. Correspondence is invited on this or on any subject relating to gas regulation or other pressure control. C-F regulators have been known to the gas industry for forty years. Catalogs on request.

CF

The Chaplin-Fulton Manufacturing Co.
28-40 Penn Avenue Pittsburgh, Pa.



HIGH PRESSURE **GAS HOLDERS** LOW PRESSURE

PURIFIERS · TANKS · CONDENSERS
STEEL PLATE CONSTRUCTION

INTEGRITY GOOD WORKMANSHIP FAIR DEALING

CRUSE-KEMPER CO.
AMBLER, PA.

Personals

Lewis B. Herrington has resigned as president of the Kentucky Utilities Co., Louisville, Ky., and associated companies.

Mr. Herrington was elected president of the Kentucky Utilities Co. in 1927. He also was president of the Old Dominion Power Co., the Lexington Utilities Co., the Kentucky Power and Light Co., the Consolidated Coach Corp. and other subsidiaries.

Robert M. Watt, executive vice-president of the Kentucky Utilities Co., Louisville, Ky., has been named temporary president to succeed Mr. Herrington.

W. B. Trammell, vice-president and general manager of Houston Natural Gas Co., Houston, Texas, has been named president of that company, filling the place of E. H. Buckner who resigned on account of ill health.

Mr. Trammell has been vice-president and general manager of the company since its organization six years ago, and in assuming the position of president, becomes one of the youngest heads of an industrial institution in the United States, being but 31 years of age.

Other officers elected include **E. S. George**, vice-president; **D. P. Perkins**, secretary-treasurer, and **J. H. Wimberly**, auditor and assistant secretary. Mr. George was also named to the board of directors of the company.

R. D. Williams, formerly with the Northwest States Utilities Co. in Great Falls, has been appointed manager of the Bowdoin Utilities Co., with headquarters in Malta. He will supervise operations in the Malta, Saco, and Hinsdale districts.

George Gott, district manager for Community Natural Gas Co., at Cameron, Texas, has been transferred from Cameron to Hanley, where he will supervise activities of the company in Chico, Oak Lawn, Rhome, Saginaw, Neward, Birdville, Godley, Burleson, Lillian, Joshua, Everman, Irving, Mansfield, Trumbull, Midlothian, Britton, Palmer, and Grapevine, Texas.

H. Paul Hoheisel, advertising manager of the Oklahoma Gas & Electric Company, has been elected president of the Oklahoma City Advertising Club. **John E. Wolf** was elected vice-president.

Charles S. Henderson of Long Beach, Calif., has been elected to the Board of directors of the Southern Counties Gas Co. of Southern California. He fills the vacancy caused by the death of A. S. Bradford, who had served on the board continuously for 20 years.

Formerly a city manager of Long Beach, Mr. Henderson has also been president of the Long Beach Chamber of Commerce and the Long Beach Rotary Club, and is well known throughout Southern California for his leadership in civic and commercial affairs. He is now president of the United Rehabilitation Corp., formed to handle the $5,000,000 fund for reconstruction work in the territory damaged by the recent earthquake.

WILLIAM JUDSON CLARK

William Judson Clark, vice-president of the Westchester Lighting Company for thirty-one years, died on June 4th of a heart ailment. He was 81 years old and a native of Bath, Me.

Before becoming associated with the Westchester Lighting Company Mr. Clark had been general manager of the fuel and appliance department of the Consolidated Gas Company of New York City and had held other important posts with that company.

He was an organizer of the National Commercial Gas Association and had served it as president.

Surviving are a son, Guy Galor Clark, and six grandchildren.

NEWS *of the* GAS INDUSTRY

Joint Sales Conference to Open June 22

In keeping with the idea suggested at the 1932 Metropolitan Regional Gas Sales Conference, this year the Metropolitan New York and the New England Regional Sales conferences will hold a joint meeting which is scheduled for June 22-24 at the Griswold Hotel, New London, Conn.

H. R. Sterrett, New Haven Gas Light Company and president of the New England Gas Association, is chairman of the combined conference. The committee in charge is jointly composed of gas men of the New York and New England districts.

The joint conference will open at 8:15 p. m., Eastern Daylight Saving Time, Thursday, June 22. A strong program of live sales topics has been arranged.

Geneva To Get Natural Gas at Early Date

Natural gas will be turned in the mains of Geneva, N. Y., late in the summer or early fall, it is expected by the Empire Gas and Electric Co. which serves that city. Regulation and adjustment of appliances will be undertaken shortly.

Officers of Pennsylvania Gas Assn.

F. M. Milward Oliver, vice president and general manager of The Philadelphia Gas Works Company, was elected president of the Pennsylvania Gas Association at its twenty-fifth annual meeting last month.

Other officers elected were A. J. Llewellyn, Kingston, first vice president; T. W. McDonald, York, second vice president; E. W. Ehmann, Ardmore, third vice president; F. W. Lesley, York, secretary; W. G. Sterrett, Jenkintown, treasurer.

Members of the governing council elected were N. G. Reinicker, Allentown; N. B. Bertolette, Harrisburg; F. P. Duggan, Lewistown; H. N. Squier, Scranton; E. A. Wakeman, Wilkes-Barre; L. B. Eichengreen, H. S. Christman and M. N. Bailey, Philadelphia; Allyn C. Taylor, Reading; John A. Frick, Allentown; H. H. Ganser, Norristown; P. E. Stang, Reading; L. W. Heath, Williamsport.

F. C. Weber Sees Need For Alert Salesmanship

The need for alert, intelligent salesmanship directed toward extending the use of gas in industry was emphasized by Vice-President F. Christopher Weber of the Brooklyn Union Gas Co., Brooklyn, N. Y., in speaking before the sixth general meeting of the Metropolitan Industrial Gas Sales Council in the Hotel St. George on May 17.

After welcoming the members to Brooklyn, Mr. Weber remarked on the change in attitude of gas company executives in regard to the need for salesmanship. Twenty-five years ago emphasis was placed on finding efficient methods of gas manufacture, he said, but today such methods have been found and the prosperity of the industry depends to a large extent on the efforts of its sales organization.

The meeting was opened by Joseph F. Quinn, of the Industrial Division, who is chairman of the council. Four papers were read at the morning session, one of which was presented by Robert H. Staniford, Industrial Sales Manager, who spoke on "Large Volume Cooking and Baking." Mr. Staniford urged that providing the best possible service was the most effective way of overcoming competition.

RE-CHROME and OIL METER LEATHERS
for **TIN** *and* **IRON METERS**
ALSO
FOR REGULATORS *and* GOVERNORS

Our Re-Chrome Tannage will successfully stand the five minute boiling test. This leather has passed the experimental stage and is now in general use by most of the leading gas companies.

Actual service tests have been going on for more than seven years under all operating conditions and the results show that Re-Chrome Leather insures longer life and lower repair costs than any other leathers.

BESSE, OSBORN & ODELL, Inc., 51 South St. Boston, Mass.

Tanners of "COLONIAL" Meter Leather

N. Y. Representatives—G. N. Bankart & W. A. Smith, 177 William St., N. Y. City

Lux Material

Guaranteed to always run uniform. It has been used by Gasworks all over the world for over 50 years. We offer same from a shipping point most conveniently located to your works. Shipped in bulk or bags.

Lux-Sponge
THE PERFECT READY MIXED OXIDE

For Gasworks having no facilities to mix their own Sponge we offer our celebrated "Lux Sponge," guaranteed efficient for Coal or Water Gas.
Samples upon request.

Chicago, Ill.

THE ALPHA-LUX COMPANY, Inc.
192 FRONT STREET - NEW YORK CITY, N. Y.

Philadelphia, Pa.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P Co.

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

Chrysler Installs Large Gas Furnace

The largest gas fired heating installation to be placed on the Pacific Coast during the year 1932, was in the Chrysler motor assembly plant at Los Angeles, Calif.

One hundred and twenty Gas Era steel furnace sections, arranged in twelve batteries of ten sections each were installed. All are automatically controlled.

83 Years of Gas Service

On September 4, 1850, gas was turned on for the first time in the city of Chicago. The company's output was sufficient to supply 125 customers, the 99 street lamps and the lighting of the city's one public building.

Since then the city's population has been multiplied 118 times; the number of customers, over 6,000 times; the company's output, about 10,000 times. And from that September day in 1850 to this, the gas service has been continuous, every day and hour and minute; its continuity was unbroken even by the Great Fire of 1871.

Navy Gas Kitchen Saves $1,000 Every Year for U. S.

One of the largest single kitchen gas cooking installations in the country has been made for the United States Naval Training Station at San Diego, California. All cooking equipment is fired with gas fuel and it is said that a thousand dollars a year has been saved in cost of repairs, cleaning and painting because of soot and smoke, and in depreciation of equipment.

This kitchen is a model of cleanliness and efficiency, reports the New Jersey Public Utility Information Committee. It has saved time and increased comfort of working conditions. Three thousand meals are served from this kitchen daily, at a fuel cost of approximately one-tenth of a cent per meal. So satisfactory has been the installation and performance of the equipment that the kitchen of the United States Naval Hospital is now being similarly provided.

Directors Added to Peoples Gas Light & Coke

The Peoples Gas, Light and Coke Company, Chicago, added to its directorate. Sewell Avery, president of the U. S. Gypsum Company; Howard Fenton, president of the Harris Trust and Savings Bank; Melvin A. Traylor, president of the First National Bank; Donald R. McLennan, Charles Goodspeed and James Simpson.

Stanley Field, Stuyvesant Peabody and Samuel Insull, Jr., old directors were not re-elected.

Convention Calendar

June

12-15 National Association of Purchasing Agents.
Chicago, Ill.

22-23 Pacific Coast Gas Association, Northwest Regional Conference, Olympic Hotel, Seattle, Wash.

22-23 Michigan Gas Association, Grand Rapids, Mich.

22-24 American Society of Heating & Ventilating Engineers.
Hotel Statler, Detroit, Mich.

22-24 New York-New England Regional Sales Conference Griswold Hotel, New London, Conn.

26-28 Advertising Federation of America & Public Utilities Advertising Association.
Grand Rapids, Mich.

26-30 American Society for Testing Materials.
Chicago, Ill.

26-30 American Society of Mechanical Engineers.
Chicago, Ill.

26-30 American Institute of Electrical Engineers.
Chicago, Ill.

September

13-15 Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, Calif.

18-19 Canadian Gas Association, annual convention, Ottawa, Can.

Week of September 25, Annual Convention of American Gas Association, Chicago, Ill.

Will Extend Vancouver Gas Plant

The capacity of the new gas plant of the British Columbia Electric Railway Company, Ltd., at Vancouver, is being increased by the addition of new ovens and other equipment, and a contract for foundations for chamber ovens has already been awarded. The addition which, it is reported, will cost approximately $300,000, will increase the capacity of the plant by 50 per cent or from 3,000,000 to 4,500,000 cubic feet of gas daily. The company's large new plant, which cost about $850,000, only came into operation in February this year, and was itself complementary to the large plant then in operation.

The new plant's present equipment of 24 intermittent vertical chamber ovens will be increased by 12 units, and one extra producer and waste heat boiler will be installed to heat the ovens. Other equipment will include rotary washer and scrubber, vertical cast iron condensers, exhauster, and tar extractor. The equipment, it is stated, has been ordered from England, and the addition is expected to be completed and ready for operation by October, this year.

The company's plant occupies a large acreage near the intersection of Carrall Street with False Creek. The company has its own wharfage, and unloading facilities. At full capacity the present plant consumes 100,000 tons of coal annually and has a daily output of 9,000,000 cubic feet of gas and, as a by-product, 35,000 tons of coke annually.

Most Heroic Act To Be Recognized by Medal

Applications for the Meritorious Service Medal, one of the most cherished awards made annually by the American Gas Association, now are being received at Association headquarters, 420 Lexington Avenue, New York, N. Y. This medal is presented to the gas company employee who is judged to have performed the most heroic act within the industry during the twelve-month period from July 1, 1932, to June 30, 1933.

Applications will be received this year until August 1, according to announcement made by Alexander Forward, managing director of the Association. Application forms will be furnished on request.

This award was established in 1923 through the generosity of the late Walter R. Addicks, former senior vice-president of the Consolidated Gas Company of New York, and it has been the means of honoring brave deeds that might have otherwise gone unrecognized. Each gas company executive is requested by Major Forward to find out whether one of his employees is eligible for consideration in this distinction. The Award not only honors the employee but the company as well.

400 POUNDS . . .

and even more if necessary, is the operating pressure of a natural gas transmission line over 12 miles long constructed of 6-inch cast iron pipe with mechanical joints. These and other mechanical joints made by members of this Association, while differing in design, are gas-tight under high pressures. Address inquiries to The Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

CAST IRON PIPE

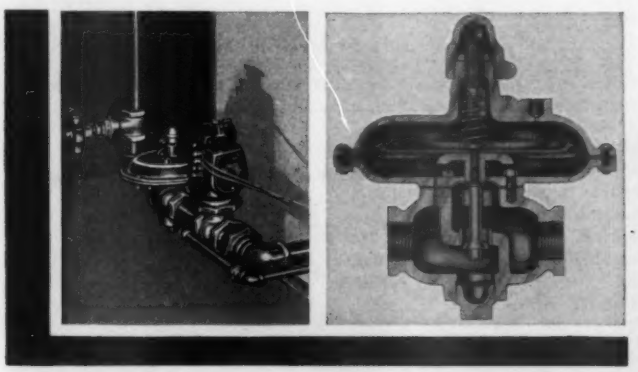
with mechanical joints

Look for this Trademark

STABILITY

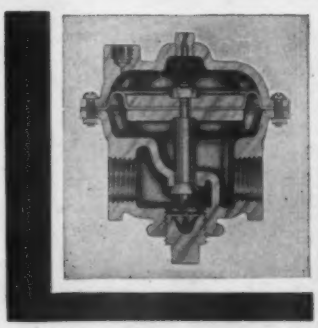
Reynolds low pressure regulators assure you of uniform delivery pressure even though the volume varies and the line pressure fluctuates. These units are precision built and delicately balanced for accurate performance on low pressure installations. The factory test through a range of operating conditions is the manufacturers pledge that the unit is satisfactory, but the thousands in operation after years of service is the proof that Reynolds low pressure regulators are safe, dependable and economical. Write!

Directly below—actual installation of furnace type regulator. At the right, cross sectional view of same regulator.



REYNOLDS REFRIGERATION REGULATOR

This unit is primarily built for gas refrigeration but it is recommended for any gas regulation where accuracy and stable delivery is required for small volume operation. Illustration at right shows cross section of regulator.



● REYNOLDS BRANCH OFFICES: 421 Dwight Building, Kansas City, Mo.; 2nd Unit, Santa Fe Building, Dallas, Tex.
● REPRESENTATIVES: Eastern Appliance Co., Boston, Mass. F. E. Newberry, Avon, N. J.

REYNOLDS GAS REGULATOR COMPANY
Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR
ALL MAKES - ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

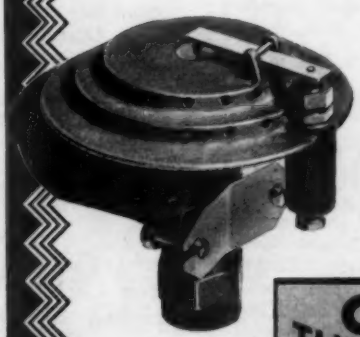
— o —

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

"We Prefer CHACE
HIGH TEMPERATURE BIMETAL
because its dependable"

GRAYSON APPLIANCE CO., LTD.



The active element which automatically controls the safety feature of this gas burner is made of Chace Bimetal and operates in flame. Submit your problems to Chace engineers.

SHEETS
STRIPS
FORMS

CHACE THERMOSTATIC BIMETAL
"It Bends with the Heat"

W. M. CHACE VALVE CO.
1810 Second Ave. . . . N. Y.

TRADE NEWS

Chicago Sales Office of Universal Pipe Changes Address

The Central Foundry Company recently announced the removal of the Chicago Sales Office of its Universal Pipe Division to 1629 Wellington Street, corner Paulina Street.

Window Display Ideas

Dennison Manufacturing Co., Framingham, Mass., have just issued their summer Bulletin titled "Display Ideas from Dennison". It contains several illustrated attractive window displays. A copy will be mailed on request.

Refrigerator Suggestion from Mayonnaise Institute

The Mayonnaise Institute, 114 East 32nd Street, New York City, is offering, free, a group of 43 Recipes for Automatic Refrigerators. These recipes have been tested by Mary H. Griffin, Home Economics Director of the Institute. They include recipes for Appetizers and Appetizer Salads, Main-Dish Salads, Salads as a Separate Course, Dessert Salads, Variations of Mayonnaise as a Salad Dressing, and Sandwich Suggestions.

Bullard Hose Mask Approved by U. S. Bureau of Mines

The Bullard Hose Mask, manufactured by E. D. Bullard Company, San Francisco, has been approved by the U. S. Bureau of Mines as permissible. This same mast has previously been approved by the American Gas Association.

A new Hose Mask catalog, including the Bullard approved Hose Mask, is now available.

Canadian Firm to Sell Pittsburgh Equitable Meter Products

Announcement is made of an agreement between the Pittsburgh Equitable Meter Company, of Pittsburgh, Pa., and Peacock Brothers, Limited, of Montreal, Quebec, Canada, whereby the latter named concern will manufacture and sell the products of the Pittsburgh Company in Canada.

Peacock Brothers, Limited, are well known throughout the Dominion, having been engaged in the manufacturing business for thirty-five years. Their factory in Montreal is most complete, including modern brass and iron foundries. Among the list of products now manufactured and distributed by this Company are valves, compressors and pumps.

For a number of years, Peacock Brothers, Limited, have manufactured and sold Nordstrom Lubricated Plug Valves under license from the Merco Nordstrom Valve Company—a subsidiary of the Pittsburgh Equitable Meter Company. This new agreement enables the Canadian firm to increase its manufacturing operations and extend its selling efforts to other fields, through the production of the Emco line of gas meters, regulators and accessories and Pittsburgh water meters and allied appliances.

The net work of Branch Offices of Peacock Brothers, Limited, extends across the Dominion. They are located in Toronto, Ont.; Calgary, Alberta; Vancouver, B. C.; Noranda, Que.; and Winnipeg, Manitoba.

New Temperature Regulator Data and Price Book

The Atlas Valve Co., 282 South St., Newark, N. J., well known manufacturers of regulating valves for every service, are announcing the "Victor" Temperature Regulator Data and Price Book pertaining to Victor Self-Contained Vapor Types of Temperature Regulators for Liquids. Four types of regulators are featured. In addition to describing fully the temperature regulators themselves considerable space is devoted to illustrations of actual applications to fuel oil control, desuperheating, and controlling the temperature of liquids under various conditions. One page briefly describes and illustrates other Atlas Regulating Devices.

Republic Steel Moves Buffalo District Sales Office

The Buffalo District Sales Office of Republic Steel Corporation was recently moved to 475 Abbott Road, Buffalo, N. Y. Thos. B. Davies, District Sales Manager, and his present staff will continue in charge at the new location.

Union Carbide and Carbon Corporation Exhibits for World's Fair Take Form

At the grounds of A Century of Progress in Chicago, the construction of the exhibits of Union Carbide and Carbon Corporation and its subsidiaries is rapidly going forward. In the spacious ground floor location in the Hall of Science Building will be shown items of outstanding interest both in the diversity of products shown and processes demonstrated, and in the ingenious means used for graphic portrayal of them.

There will be numerous operating models and dramatized diagrams to explain the uses of the products. In some cases these will be automatically activated to give repeating cycles of spectacular and instructive motion and animation.

The Union Carbide and Carbon Corporation exhibit will show the wide range of products manufactured and sold and the processes sponsored by the units of this organization: Eveready Flashlights, Batteries, Carbons, Prestone; ferrous and non-ferrous alloys and other metallurgical products; calcium carbide; compressed gases such as oxygen for medical use and for use with acetylene in oxy-acetylene welding and cutting; acetylene as used for lighting; Pyrofax gas for cooking and heating beyond the gas mains; synthetic organic chemicals in their many industrial uses, and also the "Age of Plastics" represented by the newly developed "Vinylite."

In the Hall of Science, the "Fair" management has planned to set up a huge "Periodic Table of Elements," in which will be collected in one place for the first time, specimens of all the known chemical elements. In search for these specimens, it was found that the Union Carbide and Carbon Corporation is the only practical source of a large percentage of the ninety-two elements. Accordingly, almost one-half of these are being furnished by the Corporation to the Fair management for this "Basic Science" exhibit.

New Electric Weld Tubing Handbook

Steel and Tubes, Inc., Cleveland, O., recently issued a 68 page "Handbook of Electric Weld Tubing." This handbook is the result of the first really serious attempt to establish standards for the electric weld tubing industry. It contains a fund of comprehensive and authentic information. A copy will be mailed on request.

Lambert Meter Company Issue New Bulletin

The Lambert Meter Company announces the issuance of a new bulletin entitled "Meter Repair Parts for all Makes and Sizes of Meters." This bulletin shows cuts of a great many new additional parts which can now be supplied by the Lambert Meter Company. Copies of this bulletin will gladly be mailed upon request.

Estate Stove Company Moves Offices in Los Angeles

The Estate Stove Co., recently moved their offices in Los Angeles, Calif., to 1700 Santa Fe Avenue.

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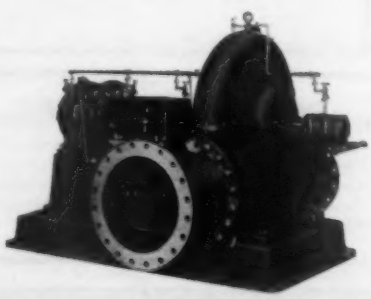

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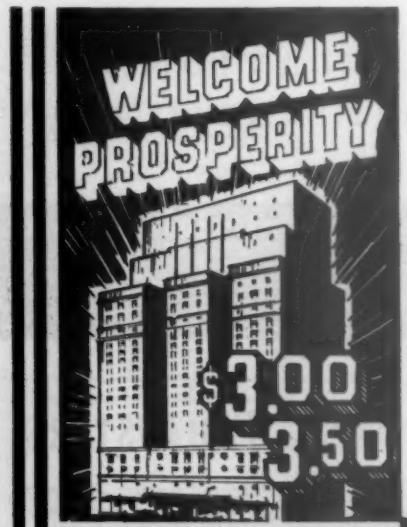

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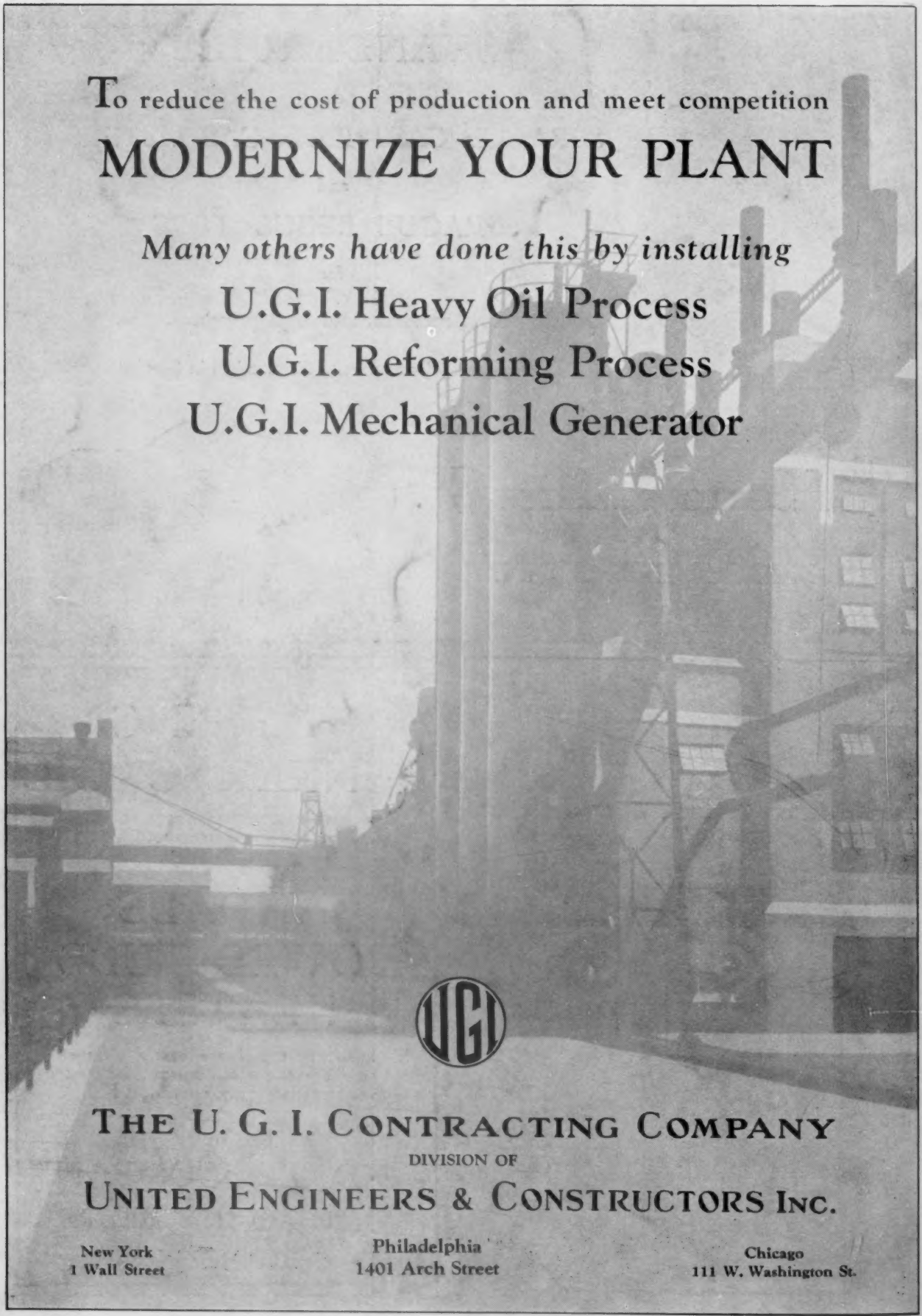
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